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AUGUST 15, 1917.

WHOLE SERIES, VOL. XLI. No. 8. THIRD SERIES, VOL. XXXIII.

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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

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EDITORIAL OFFICE, N. W. Cor. 18th and Spruce Streets, PHILADELPHIA, PA.

SUBSCRIPTION RATES:

United States and Mexico, one year,	Two Dollars.
Canada, one year,	Two Dollars and Fifty Cents.
Foreign Countries (postage prepaid), one year,	Ten Shillings.

E. G. SWIFT, Publisher, DETROIT, MICHIGAN, U. S. A.

FOREIGN OFFICES:

LONDON, ENGLAND—19 & 20 Great Pulteney St., W. SYDNEY, N. S. W., AUSTRALIA—125 York St.
WALKERVILLE, ONT., CANADA. MONTREAL, QUE., CANADA—118 St. Paul St., W.
BOMBAY, INDIA—70 Hornby Road.

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Whole Series, Vol. XLI. | DETROIT, MICH., AUGUST 15, 1917. | Third Series, Vol. XXXIII, No. 8.

ORIGINAL COMMUNICATIONS.

THE NON-SURGICAL TREATMENT OF PELVIC INFECTIONS.

BY E. E. MONTGOMERY, M.D., LL.D., F.A.C.S.,

Professor of Gynecology in the Jefferson Medical College, Philadelphia.

The wise business man takes account of stock, reviews his methods, and considers new procedures for the extension of his business. It is equally important that the conscientious practitioner should occasionally pause for consideration of his methods of procedure to determine whether they are based upon sound principles, wise judgment, and the proper utilization of the forces at his command. Upon the judicious exercise of proper treatment, the utilization of nature's forces, will depend the recovery of health and the restoration of function. To one who has lived through the last four decades a review of the progress of medicine in the treatment of pelvic inflammation presents problems, solved and unsolved, of the deepest interest.

At the beginning of this period the responsibility of infection for inflammation was generally unknown. The simultaneous introduction of such knowledge and the institution of surgical measures by Tait for the removal of its results led to such an extension of surgical procedures as threatened to imperil the safety of the race. The results of medicine were hidden, uncertain, and evanescent, while those of surgery were apparent, and seemed the direct road to the affected structures. It appeared in accordance with the Scriptural injunction, "If a member of thy body offend thee, pluck it out and cast it from thee." The inclination to early resort to surgery was encouraged by the teaching of men like Noeggerath that such infections as gonorrhea once developed were subsequently incurable: teaching which subsequent experience has demonstrated to be erroneous. Naturally when accepted that an individual thus infected was regarded as incapable of having the functions of procreation reestablished, conditions existing in such organs which make ill health inevitable, the logical inference would be that operation removed nothing of value to the infected individual, but withdrew only what would otherwise be a constant menace to her future comfort and happiness. Fortunately, notwithstanding the advocacy of surgery with all the skill an enthusiast may employ, many victims of infection declined to accept of its benefaction, and not only recovered good health but were able to bear children. Such unexpected results naturally led to an analysis of the conditions producing them. Careful observation disclosed that many cases of infection recovered both comfort and function under non-surgical means when it had been the custom to subject cases of a similar character to sacrificial procedures.

The study of such cases justified the assertion that non-surgical treatment presents the following advantages:

First, in the great majority of cases the spread of infection is limited and the patient may recover both health and function.

Second, the patient is spared the peril, the discomfort, and traumatisms of a surgical procedure.

Third, the patient will much more readily submit to treatment.

Fourth, where organs are destroyed by the infection the patient is still amenable to relief by surgical measures, and at a time when she is free from danger through the spread of infection.

The disadvantages are:

First, it is difficult to maintain the confidence of the patient and her friends in a course of watchful waiting when there is no apparent improvement from day to day. The many advisers of the family will suggest physicians who would treat the case actively and make certain the removal of the causes of her disease, so that it often seems necessary to resort to some procedure for maintenance of control, and the selection will be for something which is least capable of causing injury.

Second, the convalescence is slower than in a radical measure, but prolonged morbidity is compensated for by lessened mortality.

Third, a small percentage of cases will still have to submit to operation through local suppurative collections when it will be felt that the patient could have been saved time and suffering by earlier resort to surgery.

It is true that an occasional abdominal infection will be overlooked. It is very easy to mistake an appendicitis occurring early in the puerperium. Although experience has disclosed that the patient may recover without operative procedure, the advocates of early operation may assert that delay is unwise. The study of large numbers of cases has demonstrated that the mortality is greatly lessened by delay. In infection following both labor and abortion it requires considerable moral courage to withhold the use of the curette. Of course every case should be examined, and when the os is open and a mass of retained placenta can be felt there is no objection to withdrawing it with a pair of placental forceps; should the cervix be closed it would be unwise to use forcible means of dilatation to investigate and empty the organ. In such cases the uterus will empty itself with less injury to its protective barriers than could be accomplished by means of mechanical measures. In the presence of retained products with infection the latter will have soon passed beyond possible removal by the curette, and its employment is only breaking down nature's barriers and opening up new avenues for the spread of infection. This knowledge of the rapid spread of infection led to the employment of hysterectomy, but here it was soon realized that it did not always enable the operator to save his patients by exceeding the limits of the disease, and that where it did the possibilities were that the patient would have recovered had the mutilating operation been withheld.

No physician should feel justified in resorting to surgery unless local manifestations are present. These indications are most frequently found in the tubes and ovaries, or in the uterine sinuses. Delay is chiefly advantageous because the life of the infecting organisms is self-limited, and a late operative procedure lessens the danger of spreading active organisms.

If we are not to employ surgical measures, what shall be the course of treatment? The first consideration should be absolute rest, mental and physical. Solicitous relatives and friends should be rigidly excluded. Any disturbance of the circulation serves to promote the distribution of infective process. The promotion of elimination by mild purgation; the administration of fluids through drinking of water, and where this is not practicable its employment by proctoclysis, hypodermoclysis, or intravenous injection of salt solution, are efficacious measures. By proctoclysis enemas of 4 to 6 ounces salt solution may be given every three or four hours; or by continuous instillation (Murphy), thirty drops to the minute. Solutions thus administered are particularly indicated in peritoneal inflammations when the belly is distended and the contents of the stomach and small intestines are not transmitted to the large bowel, and

consequently are but slightly absorbed. The subcutaneous and intravenous procedures are utilized only in urgent cases when the fluid is not retained by either mouth or rectum. The spread of the infection is also limited by the application of cold in the form of an ice-bag applied over the pelvis, especially when associated with elevation of temperature. If the temperature subsides, and with it a lessening of tenderness, the cold should be replaced by heat. This may be used in the form of fomentations—a cloth wrung out of hot water placed over the abdomen, this covered with paraffin paper, then by a dry cloth, and heat maintained by a hot-water bottle or an electric pad. The disappearance of the remains of inflammatory exudate may be promoted by the application of pressure over the abdomen in the form of bags of shot, three to five pounds to each bag, and also by the employment of pelvic massage. The latter can be utilized to break up adhesions when recent, disperse collections of exudate, and facilitate restoration to position of displaced pelvic organs. The massage is best accomplished by fixing the uterus with two fingers of one hand in the vagina and manipulating the structures through the abdomen with the other hand. A more or less fixed organ may be thus pushed or pulled backward, forward, and from side to side, thus stretching adhesions and breaking apart adherent surfaces. Hot vaginal douches, glycerin-soaked vaginal tampons, and hot fomentations, associated with rest, should supplement the massage. Neither pressure nor massage should be employed when there is reason to suspect suppuration. The regulation of the action of the bowels, the use and assimilation of proper nutrition, and the improvement of the general condition are essential to the attainment of the best results.

The question will be suggested, Can this employment of non-surgical measures afford equal assurance of subsequent comfort and usefulness? It is very difficult to form conclusions from the statistics of patients treated in the wards of a hospital, because many of them have been subjected to operation previous to entrance which will or has insured wide-spread infection. The patients are used for the instruction of students in gynecological procedure, and the majority of them are women with families requiring them to get back to their duties and to those dependent upon them, so there is the constant temptation to expedite their exit by some surgical procedure.

In 296 cases of incomplete abortion treated in the wards of the Jefferson Hospital as reported by me in the *Journal of the A. M. A.*, October 9, 1915, there were thirteen deaths, five, or 3.8 per cent, of which occurred in those subjected to some surgical procedure, while eight, or 4.7 per cent, followed in those not treated surgically. However, it must not be overlooked that no patients were refused admission, and the majority of these were fatal cases and had been subjected to surgical measures before admission to the hospital, whose condition was such as to preclude its subsequent employment. The study of these cases and a comparison of the non-operative with those in which surgical measures were employed were sufficient to make one regret that they could not have been treated expectantly from the beginning.

I have no purpose to condemn surgery in proper cases, when local collections of pus can be recognized in tubes, ovaries, wall of uterus, or about the uterus; but to emphasize the assertion that the presence of pelvic infection made evident by masses of exudate in the pelvis, where often intestines, tubes, and ovaries are matted together, is not a condition demanding resort to surgery, until it is evident that suppuration so extensive as to be otherwise irrelievable is present. A surgical operation in the majority of such cases will appear to demand the removal of the uterine appendages, and such a measure, even should the patient recover good health, cannot be considered curative. The latter term should be reserved for those in whom both health and function are restored. That such a cure can be established under non-surgical

measures has been made evident by the experience of a large number of women who have suffered from either puerperal or non-puerperal infective conditions who have not been subjected to operation, and who have subsequently enjoyed good health and given birth to children. Give the patient a chance for cure; surgery can be employed when other measures prove futile.

THE INFLUENCE OF THE METHOD OF ADMINISTRATION UPON THE DEGREE OF TOXICITY OF STROPHANTHUS PREPARATIONS.*

BY L. W. ROWE. M.S., DETROIT.

The use of strophanthus in therapeutics as a heart tonic is becoming more widespread from year to year. Digitalis has for a long time been the favorite cardiac remedy and still maintains a high degree of usefulness, but its slow and more cumulative action contrasted with the more rapid and more certain effect of an active principle such as strophanthin is largely the reason for the increased use of strophanthus preparations. There is another factor which has greatly influenced the use of heart tonics in general and of strophanthus in particular, and that is the increasing use of our only means of determining the activity of these preparations, namely, physiological standardization. The extreme potency and variability of strophanthus preparations have long been recognized in an approximate sense, but it was only as recently as 1897 and 1898, when Houghton[1] introduced the first satisfactory quantitative method of physiologic assay for heart tonics, that our knowledge of the comparative potency and variability of strophanthus preparations became definite. Since that time the standardization of heart tonics by physiologic methods has been slowly taken up and perfected, so that by its aid the manufacture of comparatively uniform strophanthin and tincture strophanthus has been accomplished.

As the use of strophanthus increased the clinical data established certain therapeutic doses of each preparation for oral administration. Authorities differed somewhat as to the average oral dose of the most active preparations, ouabain and strophanthin, largely, as they thought, because of variable absorption, but since preparations of strophanthus are not so extremely potent by oral administration no great harm was done other than causing some confusion.

The greatest trouble and confusion was experienced, however, when clinicians began to follow the general trend of recent medication and to administer strophanthin hypodermically or intravenously. The pharmacology of strophanthin had not been very carefully studied or emphasized, though Hatcher and Bailey in 1908[2,3] called attention in a rather general way to the increased toxicity of strophanthin when administered hypodermically. This warning was apparently not heeded, as the physician in most cases has followed the generally accepted rule of using about half the recognized oral dose for each hypodermic or intravenous administration.

The serious difficulties encountered in hypodermic usage demand that further attention be drawn to the somewhat peculiar action of strophanthus preparations in order to emphasize and thereby minimize the danger attending their hypodermic or intravenous administration. It is with this purpose in mind, as well as with a desire to add to our scientific knowledge of the comparative activity of such important drugs, that I have carried out a series of experiments which may be briefly outlined as follows:

Four strophanthus derivatives which have been or which might be used for

*From the Research Laboratory, Parke, Davis & Co., Detroit.

hypodermic administration were selected, namely, Kombe Strophanthin, Ouabain (Gratus Strophanthin), Tr. Strophanthus U.S.P. 9th Rev., and Strophanthone Dilute. The degree of toxicity of each was carefully determined by three different methods of administration, namely, oral, subcutaneous, and intravenous. The animal used throughout the experiments was the guinea-pig.

The sample of Kombe Strophanthin (the strophanthin from pharmacopœial drug) used was one of Merck's products, which had been assayed by the M. L. D. frog method and found to be of average activity (100,000 H. T. U. per gramme based on an M. L. D. to frogs of .0000010 gm.).

The sample of ouabain used was a Merck product which had previously been found to be the most active of three samples examined by the one-hour frog method, but which contained 185200 H. T. U. per gramme when tested by the M. L. D. method. It was consequently not quite twice as active as the Kombe Strophanthin by the latter method.

Tincture of Strophanthus, though not adapted to hypodermic or intravenous injection in the undiluted form, is however so active that it can be diluted to such a degree if occasion should arise, that it could be injected hypodermically without serious results. It was therefore thought advisable to determine the intravenous and subcutaneous M. L. D.'s of this preparation in order to make the comparisons more complete. The average tincture has 1300 H. T. U. per mil.

Strophanthone Dilute was the fourth and last member of the series. This is an aqueous solution of the active ingredient of strophanthus and consequently is well adapted to hypodermic and intravenous administration. It is standardized by physiologic assay and contains 100 H. T. U. per mil in ampoules.

The following tables give the results of toxicity tests of the four preparations upon guinea-pigs, three different methods of administration being used:

TABLE I.

Kombe Strophanthin—Oral Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	296	.000015	1-100	.44	Lived
2	328	.000020		.66	Lived
3	290	.000025		.73	Lived
4	255	.000025		.64	Lived
5	247	.000030		.74	Lived
6	240	.000035		.84	Died
7	265	.000030		.80	Lived
8	262	.000030		.79	Lived
9	247	.000035		.87	Lived
10	247	.000035		.87	Lived
11	316	.000035		1.11	Lived
12	341	.000040		1.36	Died
13	291	.000040		1.16	Lived
14	354	.000040		1.42	Lived
15	327	.000040		1.31	Lived
16	317	.000045		1.43	Died
17	291	.000045		1.31	Died
18	301	.000045		1.35	Died

M.L.D. of Kombe Strophanthin orally is .000045 gramme per gramme body weight.

TABLE II.

Ouabain (Gratus Strophanthin)—Oral Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	339	.000005	1-500	.85	Lived
2	394	.000015		2.95	Died
3	300	.000010	1-100	.30	Lived
4	316	.000010		.32	Lived
5	323	.000010		.32	Lived
6	339	.000012		.41	Lived
7	296	.000015		.45	Lived
8	286	.000015		.43	Lived
9	263	.000015		.39	Lived
10	336	.000020		.67	Died
11	254	.000020		.51	Died
12	248	.000020		.50	Died

M.L.D. of Ouabain orally is .000020 grame per gramme body weight.

TABLE III.

Tincture Strophanthus U. S. P—Oral Administration.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose, Cc.	Result.
1	454	.0008	1-3	1.09	Lived
2	465	.0010		1.40	Lived
3	463	.0012		1.67	Lived
4	457	.0015		2.06	Lived
5	428	.0018		2.31	Lived
6	500	.0018	1-2	1.80	Lived
7	554	.0020		2.22	Died
8	584	.0020		2.34	Died
9	566	.0020	None	1.13	Died
10	518	.0020	1-2	2.07	Died
11	540	.0022		2.38	Died
12	382	.0022		1.68	Died
13	430	.0025		2.15	Died
14	475	.0025		2.38	Died
15	381	.0025		1.91	Lived
16	362	.0025		1.81	Died
17	441	.0030		2.65	Died

M.L.D. of Tr. Stroph. orally is .0020 mil per gramme body weight.

TABLE IV.

Strophanthone Dilute—Oral Administration.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose, mils.	Result.
1	225	.09	None	20.25	Died
2	252	.08		20.00	Died
3	280	.07		19.60	Died
4	293	.06		17.58	Died
5	212	.05		10.60	Died
6	257	.04		10.28	Died
7	281	.03		8.43	Lived
8	260	.04		10.40	Lived
9	287	.04		11.48	Lived
10	303	.03		9.09	Lived
11	327	.03		9.81	Lived
12	378	.02		7.56	Lived
13	358	.05		17.90	Lived
14	320	.05		16.00	Lived
15	330	.06		19.80	Died
16	230	.06		13.80	Died

M.L.D. of Strophanthone Dilute orally is .060 mil per gramme body weight.

TABLE V.

Kombe Strophanthin—Subcutaneous Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	393	.0000008	1-6000	1.45	Died
2	248	.0000009		1.34	Died
3	316	.0000007		1.33	Died
4	320	.0000006		1.15	Died
5	340	.0000005		1.02	Died
6	461	.0000004	1-8000	1.48	Lived
7	412	.0000005		1.65	Died
8	384	.0000006		1.84	Died
9	298	.0000004	1-5000	.60	Lived
10	297	.00000045		.67	Died
11	291	.00000045		.65	Died

M.L.D of Kombe Strophanthin subcutaneously is .00000045 gramme per gramme body weight.

TABLE VI.

Ouabain (Gratus Strophanthin)—Subcutaneous Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	452	.00000020	1-10,000	.90	Lived
2	406	.00000025		1.02	Lived
3	375	.00000030		1.13	Died
4	423	.00000025		1.06	Died
5	355	.00000030		1.07	Died
6	321	.00000020		.64	Lived
7	355	.00000015		.53	Lived
8	325	.00000025		.81	Lived
9	314	.00000025		.79	Died
10	278	.00000025		.69	Lived

M.L.D. of Ouabain subcutaneously is .00000030 gramme per gramme body weight.

TABLE VII.

Tr. Strophanthus U. S. P.—Subcutaneous Administration.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	Result.
1	256	.00003	1-50	.38	Lived
2	331	.00005		.83	Died
3	311	.00007		1.09	Died
4	363	.00003		.54	Lived
5	347	.00004		.69	Lived
6	346	.00005		.87	Died
7	367	.000045		.83	Died
8	350	.000045		.83	Died
9	382	.000040		.78	Died
10	355	.000040		.71	Died
11	310	.000040		.62	Lived
12	336	.000035		.59	Lived
13	302	.000040		.60	Lived

M.L.D. of Tr. Strophanthus subcutaneously is .000045 mil per gramme body weight.

TABLE VIII.

Strophanthone Dilute—Subcutaneously Administered.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	Result.
1	280	.0004	1-5	.56	Lived
2	233	.0006		.70	Died
3	226	.0008		.90	Died
4	367	.0004		.73	Lived
5	353	.0005		.88	Lived
6	320	.0006		.96	Lived
7	352	.0006		1.06	Died
8	347	.0007		1.22	Died
9	345	.0007		1.21	Died
10	323	.0005		.81	Lived
11	309	.0007		.93	Died

M.L.D. of Strophanthone Dilute subcutaneously is .00060 mil per gramme body weight.

TABLE IX.

Kombe Strophanthin—Intravenous Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	384	.0000005	1-4000	.77	Died
2	485	.0000002	1-5000	.49	Lived
3	475	.0000003		.71	Lived
4	385	.0000004		.72	Died
5	493	.0000003		.74	Lived
6	340	.00000035		.95	Died
7	332	.0000003		.80	Died
8	340	.0000003		.82	Lived
9	338	.00000025		.68	Lived
10	312	.00000025		.87	Died

M.L.D. of Kombe Strophanthin intravenously is .00000035 gramme per gramme body weight.

TABLE X.

Ouabain (Gratus Strophanthin)—Intravenous Administration.

Pig No.	Wt., gms.	Dose in gm. per gm.	Dil.	Total dose.	Result.
1	376	.00000020	1-10,000	.75	Died
2	342	.00000010		.34	Lived
3	354	.00000015		.53	Died
4	428	.00000012		.51	Lived
5	463	.00000015		.69	Lived
6	360	.00000020		.72	Lived
7	407	.00000015		.61	Lived
8	353	.00000020		.71	Died
9	322	.00000020		.65	Died
10	335	.00000015		.50	Lived

M.L.D. of Ouabain intravenously is .00000020 gramme per gramme body weight.

TABLE XI.

Tr. Strophanthus U. S. P.—Intravenously Administered.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	Result.
1	544	.000020	1-50	.54	Lived
2	582	.000040		1.16	Died
3	361	.000050		.90	Died
4	493	.000030		.74	Died
5	476	.000025		.59	Died
6	582	.000020		.58	Died
7	447	.000020		.45	Lived
8	530	.000015		.40	Lived
9	577	.000020		.58	Lived
10	463	.000025		.58	Died

M.L.D. of Tr. Strophanthus intravenously is .000025 mil per gramme body weight.

TABLE XII.

Strophanthone Dilute—Intravenously Administered.

Pig No.	Wt., gms.	Dose in Cc. per gm.	Dil.	Total dose.	Result.
1	550	.0003	1-5	.83	Lived
2	413	.0005		1.03	Died
3	357	.0004		.71	Lived
4	360	.00045		.81	Died
5	337	.00050		.84	Died
6	375	.00045		.84	Died
7	355	.00040		.71	Lived
8	375	.00045		.84	Died

M.L.D. of Strophanthone Dilute intravenously is .00045 mil per gramme body weight.

TABLE XIII.

Summarized Results—Minimum Lethal Doses.

Preparation.	Orally.	Subcutaneously.	Intravenously.
1. Kombe Strophanthin.	.000045 gm. per gm.	.00000045 gm. per gm.	.00000035 gm. per gm.
2. Ouabain.	.000020 gm. per gm.	.00000030 gm. per gm.	.00000020 gm. per gm.
3. Tr. Strophanthus U.S.P.	.0020 mil per gm.	.000045 mil per gm.	.000025 mil per gm.
4. Strophanthone Dilute.	.060 mil per gm.	.00060 mil per gm.	.00045 mil per gm.

TABLE XIV.

Ratio of M.L.D.'s of the same preparation by different methods of administration.

Preparation.	Subcu. to oral.	Intravenous to oral.	Intravenous to subcu.
1. Kombe Strophanthin.	100 times.	128.6 times.	1.28 times.
2. Ouabain.	66.6 times.	100.0 times.	1.50 times.
3. Tr. Strophanthus.	44.4 times.	80.0 times.	1.80 times.
4 Strophanthone Dil.	100.0 times.	133.0 times.	1.33 times.

TABLE XV.

Toxicity ratios of different preparations by the same methods of administration.

Preparation.	Orally.	Subcu.	Intravenously.
K. Strophanthin to Ouabain	0.44 times.	0.66 times.	0.57 times.
K. Strophanthin to Tr. Stroph.	44.4 times.	100.0 times.	711.4 times.
K. Strophanthin to Strophanthone Dil.	1333.3 times.	1333.3 times.	1285.7 times.
Ouabain to Tr. Stroph.	100.0 times.	150.0 times.	125.0 times.
Ouabain to Strophanthone Dil.	3000.0 times.	2000.0 times.	2250.0 times.
Tr. Stroph. to Strophanthone Dil.	30.0 times.	13.3 times.	18.0 times.

TABLE XVI.

Toxicity ratios for the same preparations, upon different animals.

Preparations.	Guinea-pigs, subcu.	Frog, subcu.
K. Strophanthin to Ouabain.	0.66 times.	0.5 times.
K. Strophanthin to Tr. Stroph.	100.0 times.	77.0 times.
K. Strophanthin to Strophanthone Dil.	1333.3 times.	1000.0 times.
Ouabain to Tr. Stroph.	150.0 times.	153.8 times.
Ouabain to Strophanthone Dil.	2000.0 times.	2000.0 times.
Tr. Stroph. to Strophanthone Dil.	13.3 times.	13.0 times.

The first twelve tables give a detailed account of each toxicity test and need no further comment. In the last four tables the results obtained have been summarized in different ways. A careful consideration of these tables serves to bring out several important and unusual facts.

In the first place, in Table XIV the great difference in degrees of toxicity of the same preparation when administered hypodermically and when given orally is clearly brought out. Thus Kombe Strophanthin and Strophanthone are 100 times as toxic when given subcutaneously as when given orally, and even Tincture of Strophanthus, which shows the least difference, is 44 times as toxic by the subcutaneous method as by oral administration. The increased toxicity by intravenous administration over subcutaneous dosage is very much less, being in no case over 1.8 times as toxic for the same preparation. It is thus apparent from this table of relative toxicities that the satisfactory therapeutic dose of any of these preparations for intravenous or subcutaneous use cannot be derived from the previously determined therapeutic dose for oral administration by the usual rule of giving ½ to ¼ as much. With the ratios of toxicity subcutaneously to orally ranging from 100 to 44 times for the different preparations, serious results would be almost certain to follow the subcutaneous administration of one-half the therapeutic oral dose.

Hatcher[4] first observed the marked difference in toxicity of strophanthin when given subcutaneously and orally. He accounted for this fact partly by saying that the excretion more nearly kept pace with the slow absorption following administration into the alimentary canal. He also advanced the theory that strophanthin may be partly destroyed in the alimentary canal. The view held by Cushny[5] that because of the glucosidal nature of strophanthin the abnormally low oral toxicity is *largely* due to destruction of the strophanthin in the alimentary canal by the ferments of the digestive tract is a very logical and satisfactory explanation of the peculiar action of strophanthus. If this be true, the oral administration of strophanthus preparations is illogical and certain to cause confusing results, since the destruction and absorption will not be uniform. The absorption following hypodermic administration is much more rapid and certain, since there is slight opportunity for the destruction of the active principle. The greatest caution must be observed, however, particularly in the *intravenous* use of strophanthus preparations, that the dose is not too large.

Strophanthin for hypodermic or intravenous use is usually placed on the market in 1-mil ampoules of a 1-to-1000 solution. The activity of such a solution of the average Kombe Strophanthin, according to tests upon frogs, is just equivalent to that of Strophanthone Dilute in 1-mil ampoules. For intravenous administration .5 mil of such solutions should be large enough to produce the desired therapeutic effect.

Ouabain or Gratus Strophanthin has been recently recommended for hypodermic or intravenous use because of its purity and supposed uniformity. Recently published tests[6] show a lack of uniformity in samples of ouabain, but the *average* activity is about twice that of Kombe Strophanthin (a statement first made by Gley[7]), and consequently it should be borne in mind that only half as large a dose should be given.

Table XV serves to show just how much more toxic Kombe Strophanthin and Ouabain are than Tincture of Strophanthus and Strophanthone Dilute by three methods of administration to guinea-pigs. It also shows how closely the relation is maintained in the different methods.

Table XVI gives a comparison of the

toxicities of the different preparations as determined upon frogs and guinea-pigs. The comparatively close agreement is rather remarkable.

CONCLUSIONS.

1. The subcutaneous and intravenous toxicities of the four strophanthus preparations tested are from 45 to 100 times as great as their oral toxicities.

2. It has been demonstrated that the satisfactory oral dose is not a true index of the potency of strophanthus.

3. To obtain the most uniform and satisfactory therapeutic results strophanthus preparations should be administered hypodermically. Extreme caution should however be exercised in selecting a sufficiently small dose for subcutaneous and intravenous injection.

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CLINICAL NOTES ON VACCINE THERAPY.[1]

BY CURRAN POPE, M.D., LOUISVILLE, KENTUCKY.

There is no more interesting subject for study than vaccine therapy. Its very history is interesting, and its practical import is so great that none of us can afford to ignore it.

We no longer have to visit the dead-room to ascertain that the patient has had pulmonary lesions which have healed. This is shown by the fluoroscopic screen and in the radiogram, and especially is this true in tubercular involvement of the bronchial glands. Calcareous and caseous deposits are frequently noted, showing evidence of previous infection, probably tubercular.

While this is merely a suggestion, specificity does not seem to be necessary in the production of immunity. I believe that future investigations will prove that non-specific protein—I would much prefer to think of bacteria and their products as albuminoid material or protein than as dead germs—can produce immunity. In some original work that I have been doing in the past year in one or two diseases, I think immunity has been produced by the use of non-specific protein.

So far as most practical workers are concerned to-day, the opsonic index is a dead issue. The laboratory man does not care to make such tests because they are insufficiently remunerative, and the practical field worker has no need of them. Study of the patient will enable one to determine when to administer the second dose of vaccine.

The question of the protein molecule, the amino-acids, etc., is something which is not only interesting but most perplexing in its scientific aspect. In my opinion we have not yet even scratched the surface of the possibilities in connection with the protein molecule. We are just beginning to appreciate the fact that the blood itself is a "secreting organ," that the blood cells secrete an enzyme which has the power of dividing the protein molecules into finer atomic particles; nor do we appreciate all the rôles played by the red cells.

The basic feature in vaccine therapy is the negative phase of protein intoxication, for that is what you first secure when you administer bacterial vaccine; you overwhelm the individual with protein intoxication, and then say that the patient has a reaction, the so-called positive phase occurs. Thus we have action and reaction, which are equal and opposite, so to speak, in the law of physics, and the opsonic index rises above the normal. Then nature endeavoring to maintain a balance and equalize things, the index recedes toward the normal.

Practical experience demonstrates that we cannot always overcome infection with a single injection of specific or non-specific

[1]Delivered before the Louisville Medical Club, of Louisville, Kentucky, December 15, 1916.

protein, and it may be necessary to administer the second or possibly the third dose. Following each injection the system to a certain extent acquires immunity to the influence of the protein, and therefore the next reaction is less, and so on until there is simply a reactive recession of the index. That is to say, it remains above the normal, and when that stage is reached it is time to discontinue the vaccine, because there has been secured an actual immunity.

Whence does immunity come? That is a tremendous problem. In some respects I believe we fall just a little short in our conception of what has been accomplished. We say the blood has acquired the power through an enzyme or something else to overcome infection due to that particular invading protein, whether it be the streptococcus, the staphylococcus, or what not; but it must be remembered that the liver is constantly destroying the blood cells, they are being disintegrated and eliminated from the system at the rate of many millions a day, and that the blood serum is being oxidized and consumed by the body tissues. Whence, then, does immunity really come? Is it from the blood?

I accept the proteo-morphic theory of Williams that immunity is granted by the action of protein upon certain organs—the bone-marrow, the lymph glands, the spleen, possibly the liver and the thymus gland; that this something we call immunity is granted these particular organs which make the blood cells. Each of these organs has something to do with the different cells which are manufactured and distributed by the blood stream, and confers upon the cell that enzyme, proteolytic or hydrolyzing power acquired by the action of the foreign protein on any of these organs.

Immunity, then, does not lie in the blood stream, or in the blood as a tissue, but lies in the organs which make the blood itself. If that be true, we might logically believe that non-specific protein may so influence this hemopoietic system as to confer upon these blood elements, not a specific immunity against any particular disease, but a heightened power against any foreign protein introduced into the system. This theory opens an absolutely new field of investigation, and if it proves true will enable the physician to prevent and cure many of the diseases which at present are resisting specific or attempted specific medication.

This subject has been of great interest to me during the last two years. I have spent many hours in study, reading, and experimental investigation, and while I am not yet ready to make any definite statement, I believe in a number of diseases I have demonstrated that there is an activity in non-specific protein, that its administration will promptly and satisfactorily relieve existing diseases, and that in patients known to have been exposed to disease it has granted immunity on inoculation. Therefore, it opens a tremendous field for all of us, and I hope in the course of a year to complete my work and publish the results, which have proven so far most interesting and satisfactory.

I desire to say in closing that certain infections may be as satisfactorily treated with stock as with autogenous vaccines, and these belong to the streptococcic, pneumococcic, staphylococcic, and mixed types. On the other hand, my studies lead me to believe that stock vaccines in the various colon bacilli infections are worthless. It is not the fault of the manufacturer, because there are so many strains of the colon bacilli (sixteen or eighteen have been identified) that it is impossible to tell which one predominates.

I have personally suffered from colon bacillus infection, and could not get relief until an autogenous vaccine was used. Since then I have experimented considerably with stock and autogenous vaccines in colon bacillus infection, and have secured practically no or only occasional results from the stock vaccine, but the autogenous vaccine has been exceedingly satisfactory.

Another infection in which in my experience little good is obtained from stock vaccines is that due to the bacillus pyocyaneus, but autogenous vaccines will be found satisfactory.

I never trust simply to clinical intuition

in determining the type of microörganisms present, but microscopically examine the discharge or other material available. Cultures are then made, and where it is deemed necessary autogenous vaccines are prepared.

The investigations of Wright have opened a most fertile and promising field, and the more you study the subject the wider the horizon becomes. The next step is in the line of non-specific proteins.

THE HEMORRHAGES OF PREGNANCY, INCLUDING PLACENTA PREVIA.

Davis in the *Medical Record* of May 19, 1917, asserts that where the placenta is over the internal os, the case is imperatively one for hospital. It were far better that all cases of placenta previa be treated in hospital, but under some circumstances those where the membranes are available may be managed in the patient's home, but central placenta previa as much demands hospital care as does ectopic gestation.

In the presence of this condition the obstetrician has his choice of several procedures. The first is that accredited to Braxton Hicks whereby the placental tissue is torn through, a foot of the child grasped, and the leg and breech drawn into the pelvic cavity and into the cervix. No effort is made to deliver, but the fetus is used as a plug to check hemorrhage. The life of the child is disregarded. Necessary stimulation may be administered, and no interference should be practiced until the uterus contracts. Spontaneous expulsion should be encouraged and awaited. Should this positively fail, however, cautious extraction followed by firm packing is indicated.

Of late years the intraovular or intracervical use of the dilating bag has been considerably tried. On the Continent obstetricians prefer to introduce the bag within the placenta, if possible, while those American obstetricians who employ the method are content to pass the bag through the cervix, expanding it against the placenta. As rapidly as possible the dilating bag is distended with fluid and the cervix dilated. Delivery may then be effected, rarely by forceps, usually by podalic version. The question of immediate extraction will depend upon the condition of the child, the possibility for rapid and easy delivery, and the condition of the mother. This method has the danger of producing complete separation of the placenta and of requiring considerable time before the uterus can be emptied. Remembering the unusually softened condition of the cervix and lower segment in placenta previa, it is evident that great force must not be used in dilating. Perhaps one of the most dangerous things which can be attempted in obstetric surgery is the dilatation of the cervix in the case of placenta previa with Boss's dilator. This powerful instrument will tear such a cervix often into the pelvic cavity and rapidly bring about a fatal issue. The treatment with the bag is uncertain and hemorrhages may be concealed until the patient is in a grave condition.

The delivery of cases of placenta previa by vaginal Cæsarian section is not indicated, because of the unusually vascular condition of the field for this operation.

Abdominal Cæsarian section for placenta previa was advocated years ago by Bernays of St. Louis and by Continental obstetricians. Within the last five or ten years it has received considerable attention. Many American obstetricians limit its employment to cases of central placenta previa where the os is slightly dilated and the cervix firm and resisting, and the mother and child in good condition. The writer has enlarged these indications somewhat and for some time has treated cases of placenta previa in which the membranes were not readily available by abdominal Cæsarian section. In a series of 27 cases, 25 mothers have recovered and two mothers have died. All children in fairly good condition survived the operation. In operating, the uterus was turned out of the abdomen, rapidly emptied, and firmly packed with 10-per-cent iodoform gauze, the end of which was carried through the cervix into the vagina. While this was being done, from 20 to 30 ounces of saline solution were injected into a vein in the arm. Other stimuli were given by hypodermic injections.

EDITORIAL.

IMMUNE SERUM FOR POLIOMYELITIS.

Older practitioners will recall how impotent they felt in the presence of a case of diphtheria when they met it thirty years ago, and to-day they look back upon the only measures which they could carry out at that time as being woefully incompetent. The outbreak of poliomyelitis which occurred during the middle months of 1916 brought these facts to mind with considerable force, for during this outbreak the various measures which were employed seemed equally futile, and many of them did not profess to be curative but only symptomatic. It would seem that the introduction of adrenalin into the subarachnoid space, as proposed by Meltzer, possesses some value, but it is possible that the results which accrue from the puncture arise because of the abstraction of a certain amount of cerebrospinal fluid as well as through action on the part of the adrenalin itself.

From the first it has been hoped that some vaccine or immune serum might be developed which would enable the victim to make a successful fight against the disease. Of course in the fulminant cases there is little opportunity to use any remedy, even if it be specific, before the damage is done, but in a large proportion of cases the opportunity to employ an immune serum will exist, and, judging from our experience in regard to other infectious diseases, such an immune serum holds out more promise of benefit than any other measure which is in sight. At present it would seem that the source of this immune serum must be chiefly, if not entirely, derived from individuals who have survived an attack of poliomyelitis, for matters have not advanced to such a point that animals artificially immunized can be employed. The profession will therefore be keenly interested in some of the recent work which has been done along these lines.

In the *Journal of Experimental Medicine* of April 1, 1917, Flexner and Amoss, in contributing a brief paper upon the "Passage of Neutralizing Substances from the Blood into the Cerebrospinal Fluid in Poliomyelitis," state that as far as present results can be interpreted the therapeutic value of immune serum is largely confined to the early period of the disease, corresponding with the onset, and that later on, when paralysis has already appeared and is extending, its usefulness is materially impaired, although not excluded, and they add, in the conclusions of their paper, that the blood serum on the sixth day of the disease contains neutralizing principles which will be of service if they are employed. Possibly the most noteworthy part of their communication is the statement that it is established for monkeys and rendered probable for man that the intraspinal injection of immune serum in poliomyelitis is curative. On the other hand, it would appear that the employment of normal serum is of no value.

In a paper which is more largely devoted to the clinical aspect of the matter, Amoss and Chesney contribute to the same issue of the *Journal of Experimental Medicine* the records of a considerable number of cases which have been treated by the use of immune serum. While the number of cases which they have had is not large, amounting to only twenty-six, nevertheless they feel that they can conclude that the serum, when introduced intraspinally under suitable conditions, is harmless. When introduced it should always be employed by the gravity method rather than by the use of a syringe. It is essential that the serum to be injected shall be free from corpuscles or hemoglobin, or, in other words, only perfectly clear and colorless samples are to be employed, since the introduction of corpuscles or hemoglobin is equivalent to the passage into the subarachnoid space of foreign substances.

Returning to the matter of the introduction of the serum by gravity, it is pointed out

that in acute poliomyelitis the lumen of the blood-vessels is early encroached upon by perivascular infiltration, which, in turn, interferes with the nutrition of vital cells. If the pressure of the cerebrospinal fluid is, therefore, materially increased damage is done, and to avoid any increase in pressure it is essential not only that the gravity method shall be used, but also that a greater amount of spinal fluid shall be first removed than the quantity of serum which is to be injected. If symptoms of increased intracranial pressure arise they are to be removed at once by prompt withdrawal of the fluid.

In their studies the time limit which they consider as equivalent to early treatment was set at forty-eight hours after the onset. Out of their twenty-six cases eighteen were treated within this time. The best results being obtained in those patients which received the treatment within thirty hours after the onset, although beneficial results were obtained in one case as late as ninety-six hours after the beginning of the illness. The serum which they employed was obtained from persons recently recovered from poliomyelitis, at which period it is supposed to contain immune substances in greatest concentration, and they believe that if serum can be obtained only from patients whose attacks are more remote correspondingly larger doses should be employed.

From these and other experiments it would appear that the use of immune serum early in the disease is not only advantageous in the sense that it serves to protect before great damage is done by the infection, but also because it serves to bridge over the period during which the patient is developing his own immune bodies, since not until the sixth day of the disease are these immune bodies present in readily detectable quantities in the blood. Another advantage is that the intraspinal injection results in bringing the immune substance in direct contact with the diseased area with promptness, whereas those immune substances which are naturally developed in the blood have first to pass through the meninges and the choroid plexus in order to reach the damaged nervous tissues. Nevertheless, in urgent cases both intraspinal and intravenous injections should be practiced.

Concerning the dose of the serum, Amoss and Chesney found that those patients who received a total of more than 30 Cc. within forty-eight hours after the onset, without regard to the clinical condition, age, or temperature, seemed to be benefited in every case but one, and in this case the temperature quickly dropped to normal. They therefore think that it is highly desirable to administer at least 50 Cc. of serum in every case, and if possible to treat the cases within thirty hours after the onset of the first symptom. The first proposition is not as difficult as the second. As the result of their clinical observations, which were primarily based upon experiments of a laboratory nature, they conclude that immune serum from recently recovered cases of poliomyelitis probably yields the best results that can be obtained to-day, and that if this serum is sterile, as to ordinary bacteria, and free from corpuscles and hemoglobin, it may be employed without danger, if it is injected by the method already described when used intraspinally, and also that it may be used intravenously. In some cases it is also advantageous to use it subcutaneously.

As would be supposed, they found that the action of the serum seems to be more effective in arresting paralysis than in rapidly bringing about its retrogression. Their investigations have not gone far enough to enable them to determine how frequently the injections should be repeated, but they believe, in those cases in which some degree of muscular weakness develops soon after the first injection, a second injection twelve to twenty-four hours later may be advantageous. Possibly, too, the temperature curve may serve to indicate the time for reinjection.

Apparently, at the present time, we are in the position of seeing much promise in this method of treatment, which is crude as yet, and which is largely limited by our

inability to obtain immune serum from animals. It is to be hoped that further laboratory investigations as to the character of the disease will before long enable us to obtain an immune serum from animals in large quantities. It would appear, too, that the early diagnosis of the disease in future is to be reached rather by examination of the cerebrospinal fluid, obtained by means of spinal puncture, than by the observation of ordinary symptoms.

As is well known the onset symptoms in acute poliomyelitis differ greatly in degree and kind. They may be fulminant or so mild as to escape notice, and as successful treatment, so far as the use of immune serum is concerned, must be instituted early if it is to be successful, an accurate diagnosis at the onset is most important. For this purpose spinal puncture has been and may be employed, but it ought not to be resorted to unless there is no other means of gaining additional information as to a correct diagnosis of the condition which is present, because it has been pointed out by Flexner and Amoss that the act of puncture may provide an opening through which the virus of the disease may pass from the blood stream into the central nervous tissues and so aid the spread of infection. On the other hand, if spinal puncture is decided upon there are a number of facts to be considered, although there is nothing in the spinal fluid which is characteristic, or pathognomonic, about it. As a rule the fluid is under slightly increased pressure, is clear, or faintly opalescent, and only becomes turbid late in the disease when paralysis has developed. If small amounts of blood are present and the physician is confident that this blood did not enter the fluid as a result of puncture the blood may be considered as evidence that severe poliomyelitis is present. It is in cases of polioencephalitis that it is most important to differentiate between this disease and meningitis due to the meningococcus, pneumococcus, tubercle bacillus, or other organisms. In meningococcic and pneumococcic meningitis there is a very high cell count. This, however, is also true of the fluid in polioencephalitis, but there is this marked difference, that in polioencephalitis the cells are almost invariably mononuclear, whereas in the other two conditions they are polymorphonuclear. So, too, in these conditions there is prone to be a greater amount of albumin in the fluid, and the sugar in the fluid is decreased or absent, whereas in polioencephalitis Fehling's test shows the presence of sugar. In these conditions, too, particularly in the meningococcic infection, the fluid is apt to be cloudy or opaque, and the examination of it under the microscope shows the intracellular organisms. In tuberculous meningitis the fluid is always clear, and while the cell count is high the characteristic cell is a small lymphocyte. Kollmer thinks that there is greater quantity of albumin present in the fluid of poliomyelitis than in tuberculous meningitis, but the variation in protein content is not sufficient to be of much value. It is important always in examining the fluid microscopically that the examination be made promptly after its withdrawal.

QUININE IN SEVERE MALARIAL INFECTIONS.

There is probably no subject of greater interest to a large number of practitioners in all parts of the world than the one with which this article deals, unless it be the consideration of the treatment of tuberculosis or syphilis. We have from time to time called attention to the opinions of men who have had large clinical experience in the treatment of malaria in the tropics by the use of quinine and other remedies, and we have discussed the question exhaustively as to whether quinine should or should not be used in the presence of malarial hematuria and hemoglobinuria.

We have also considered at various times the advantages and disadvantages of the hypodermic injection of quinine, either as a curative agent or as a prophylactic, and have pointed out that in India it has been found that such injections seem to predispose in some cases to the development of tetanus, even when the solution injected and the needle and syringe were absolutely

sterile, probably because tetanus spores, already in the body, found a favorable place to develop where the quinine induced peculiar changes in the tissues.

We have also pointed out that when quinine is used hypodermically it should be given into the belly of a muscle, and not into the subcutaneous tissues, in order that it may be promptly absorbed and that it may not cause a slough. Last of all we have considered the important question of the value of so-called prophylactic doses of quinine in persons exposed to malarial infection, and pointed out that such doses frequently result in the development of an immune strain of the parasites, which rapidly mature when the patient stops taking quinine, and which is so resistant to the drug that even full doses may fail to cure. This view is thoroughly upheld by Michael, who contributes an article upon "Quinine and Malaria" to the *U. S. Naval Medical Bulletin* for April, 1917, and who believes that while quinine has an important place in malarial prophylaxis, only second to personal protection against the mosquito, the best method is the administration of three large doses whenever there is the slightest symptom of the presence of the disease, as, for example, fifteen grains of quinine are given at noon, twenty at night, and fifteen the following morning. This treatment is given at intervals of one week, and each course is preceded by a purge.

Attention has once more been directed to the subject of the best means of giving quinine by an interesting and valuable article contributed by McLean, surgeon in the U. S. Navy, to the *U. S. Naval Medical Bulletin* for April, 1917, in which he discusses the intravenous administration of concentrated solutions of a soluble salt of quinine in malaria and hemoglobinuric fever, the opportunity for his observations having been afforded by an outbreak of malaria and blackwater fever among the U. S. marines in Haiti during the spring of 1916. The hospital ship *Solace* was ordered there to study and combat this epidemic, and remained there from June 2 to September 4, during which time thirty cases of malaria and six cases of blackwater fever were received. Three of the blackwater fever cases were convalescing when they came on board, and while the urine was free from hemoglobin, blood cells, and bile pigment, they were still running slight daily temperatures. The other three cases showed hemoglobin only fourteen hours before, were in the acute stage of the disease, and the blood of one of these cases showed a small ring-form infection. Most of the thirty cases were infections with benign tertians, but in five of them the malignant tertian organisms were found.

The point of chief interest in this report is the use of quinine in concentrated solution, one grain to one mil of sterile water, intravenously, which was suggested to Dr. McLean by Dr. Spear, another naval medical officer, while the ship was at Guantanamo Bay a year previously. About four hundred intravenous injections, using the concentrated solution named, have been given on board the *Solace* with excellent results without a single unfavorable reaction or the slightest indication of danger, even when the patients were very anemic, weak, and cachectic in appearance.

Heretofore the fact that quinine when injected in full dose into a vein is prone to act as a cardiac depressant or has seemed to cause hemolysis, has made most clinicians fearful of administering it by this route, but careful daily urinary examinations failed to reveal any evidence of hemolysis. So, too, systematic blood examinations at regular intervals failed to show at any time the slightest indication of damage to the red cells; on the contrary the red-cell count showed an early increase in all cases after very few injections. Thus, one patient who showed 3,700,000 reds and hemoglobin seventy per cent received daily intravenous injections for over one month, although the temperature remained normal after the third day, and at the termination of his treatment his reds were increased to 5,200,000 and the hemoglobin practically normal, thereby confirming an observation, made by the writer of this note many years ago, that quinine distinctly increases the number of red blood

cells. McLean admits that in carrying out his treatment he went contrary to the instructions and cautions given in most text-books on tropical medicine, particularly in the free administration of quinine intravenously in hemoglobinuria, but he makes the important additional statement that, while these injections were made regardless of the time or stage in the disease, proctoclysis, sodium bicarbonate, and saline transfusion was used in conjunction with it to counteract dehydration, acidosis, or decreased urinary elimination due to excessive and continued vomiting. He states that the hemoglobinuria cleared up within sixty hours after the first treatment, and the febrile temperature, which had been present for weeks, dropped to normal in two or three days.

So good were the results that five of the hemoglobinurics were returned to duty in the tropics. The solution employed consisted in one grain of chlorhydrosulphate of quinine to each mil of sterile water, and ten mils, that is the equivalent of ten grains, were injected at each dose, although sometimes as much as fifteen grains were given. After the solution is made it is filtered, placed in autoclave at fifteen pounds for twenty minutes, and when cooled is ready for use. A fresh solution should be made each day. The method of administration consists in painting the skin over the forearm with iodine tincture, placing a rubber tourniquet about the arm, introducing the needle through the skin into a vein, and connecting the needle with the syringe, which has been previously loaded. The tourniquet is released and the injection gradually given. Of course, all ordinary aseptic procedures should be adhered to.

The symptoms immediately observed by the patients consist in a moderate burning sensation in the throat, followed by a slight cough and sensation of warmth in the lungs, which quickly passes to all parts of the body, giving the sensation of a fever. Quickly following this there is some dizziness and occasionally a very mild, transient syncopal attack, which leaves slight dizziness lasting for about five minutes, after which the patient is able to get up and go about. The pulse is slightly quickened. Nausea and headache are rarely present. The patient is usually given an injection sitting in a chair, and then made to lie down for ten minutes. Usually two injections a day are given, at 9 A.M. and 7 P.M., for four or five days, and then, for ten days, once a day. Quinine is not used by the mouth. McLean claims that this method of using concentrated quinine solution is better than when large quantities are given, since the small quantity of water employed is less apt to produce reaction. If we mistake not, a number of observers are in accord with this view. McLean has had unfortunate results with intramuscular injections, namely, abscesses and painful lumps, particularly in debilitated patients. When giving intramuscular injections some clinicians drive the needle through a small piece of rubber dam placed on the skin in order to get rid of any quinine solution which may be on the outside of the needle.

For the reasons given above McLean reaches the following conclusions:

1. In malaria and blackwater fever the use of concentrated solutions of quinine intravenously is the method *par excellence*.

2. Quinine intravenously should be given in concentrated solutions—*i.e.*, 10 to 15 mils—and not in dilute solutions of 200 and 300 mils.

3. Under ordinary precautions and sterile technique the concentrated solution is practically free from danger.

4. As regards systemic reaction it has many advantages over the dilute solution.

5. In results this method has many advantages over any other method of giving quinine in malaria.

6. In some cases the use of the dilute solution is dangerous.

7. The intramuscular method has many objectionable features.

8. By the use of concentrated solutions the attack can be cut short and terminated, the patient saved much suffering and discomfort, and in a military service much saving of money, time, and services to the government can be made.

9. The results obtained are sufficient to make one feel that it is not only a safe method, but by far the quickest and surest way of eliminating the malarial organisms from the system.

In another article contributed to the *U. S. Naval Medical Bulletin* for April, 1917, by Torrance and Bowman, of the U. S. Navy, they discuss the question of the use of quinine in malarial hemoglobinuria, so-called, and report cases to support their views in favor of its employment. The nausea which is so commonly present in persons suffering from malaria makes the use of quinine by the mouth disadvantageous. Intramuscular injections are inadvisable because they tend to the possibility of tetanus. They believe that absolute rest in bed is essential, in the use of calomel followed by a soap-suds enema, and that large quantities of water containing thirty grains of sodium bicarbonate to the pint are indicated, or, if vomiting prevents this, the use of the Murphy drip. Caffeine seems to be a useful stimulant, and hot fomentations applied over the kidneys may be advantageous. They believe that quinine is superior to salvarsan, and that it is far better to run the chances of the slight hemolytic action of quinine than to risk the enormous destruction of red cells caused by the rapidly multiplying malarial parasites.

THE TREATMENT OF CHRONIC INTESTINAL STASIS.

Members of the medical profession, like all other human beings, naturally follow men who, because of ability, devise new or modified plans of treatment for conditions which have heretofore failed to completely respond to older therapeutic procedures. The fact that the method of treatment is distinctly novel seems to possess a charm which they cannot resist, yet the general practitioner should regard novel and new plans of treatment with sufficient distrust to make him cautious in resorting to them; although, on the other hand, it may be well said that he who is unwilling to take up everything that is new and which seems to possess value will soon be left hopelessly in the rear, both as to his own mentality and as to his practice.

Surgical procedures, from one point of view, when novel are prone to be more radical than medical procedures, but we fear that both medical men and surgeons sometimes discard the old for the new too hurriedly, and surgical practitioners are at times prone to show what surgery can do rather than what it ought to do.

For a number of years the subject of intestinal stasis has been prominently before the medical profession. For a long time after Glénard pointed out its importance in association with enteroptosis it failed to receive the attention which it deserved, but comparatively recently it has been treated by various measures ranging from mineral oil to Lane's very radical advocacy of excision of part or all of the large bowel. On two occasions we have published the opinion of Clark as to the very limited usefulness of Lane's operation; indeed, it is a question as to whether it has any field of usefulness except under the most extraordinary conditions, for it does the patient little good to be deprived of his colon and become a sufferer from chronic diarrhea, instead of intestinal stasis, with all the additional abdominal discomforts and illness which necessarily follow such radical interference with the physiology of the digestive tract, if the patient is fortunate enough to recover from the surgical procedure itself.

The use of the *x*-ray has, without doubt, enabled us to discover intestinal stasis and enteroptosis as causes of other symptoms which have hitherto been obscure in origin, but even at the present time it would appear that the *x*-ray plates showing marked displacement of the colon are not to be relied upon as indicating that such a condition is anything more than a peculiarity of the patient who is being examined, since certain patients who have such displacements have no intestinal symptoms, near or remote, and it is quite possible that in some *x*-ray reports the colon may have been out of place at

the moment, and yet was capable of performing its function perfectly. In many instances the use of a proper diet, proper laxatives and tonics, the use of a supporting belt, or of supporting adhesive strips, will do all that is necessary, and even if perfect recovery is not attained the patient will be better off than if he submitted to a radical surgical operation. It is probably true at the present time that certain cases of intestinal stasis and enteroptosis are overlooked because marked relaxation of the abdominal wall does not call attention to their probable condition, and it is quite remarkable how in some of these cases the use of proper abdominal support and other measures will benefit the patient. Certain it is that operative interference for these conditions ought not to be resorted to until every other measure has failed.

A useful article dealing with this matter has recently been contributed to the *Interstate Medical Journal* by Hayes, who points out that intestinal stasis is responsible for a large number of cases of disturbed digestion of the chronic type. However much Lane may be mistaken in the radical measures which he advocates from the surgical standpoint, his grouping of cases of chronic intestinal stasis is nevertheless wise. The first group, amounting to about ninety per cent, he thinks is suitable for medical treatment; the second group needs active surgery for the breaking up of bands and the relief of kinks; and the third group, or the severe one, which requires a short-circuiting operation or colectomy.

So far as the first great group is concerned it is manifest that raising and holding the abdominal viscera in approximately the normal position is the essential element to be sought, as well as medicinal measures designed to regulate the bowels to moderate peristaltic movement in the small intestine. In many cases it is also necessary to correct the secretory and motor function of the stomach and check putrefactive changes and fermentation in the intestine. The first condition is to be relieved by laxatives and the second by tonics and digestive agents, the putrefactive changes to be corrected by the use of the Bulgarian bacillus, and the excessive fermentation by intestinal antiseptics in the class of drugs. So, too, putrefactive changes are to be corrected by excluding, or cutting down, proteins from the diet, and fermentative changes by diminishing the starch intake. Certain exercises designed to strengthen the abdominal muscle are also advantageous. In certain cases with marked stasis massage of the abdomen is an excellent therapeutic measure. For keeping the feces soft mineral oil is advantageous, and cascara, phenolphthalein, or agar-agar may be used as laxatives. Occasionally it is wise to give Carlsbad salts when first awakening in the morning, or to use some other active saline, and it is important in many of these cases that the solution should be hot and not cold. So, too, an outdoor life and a degree of exercise which does not proceed to exhaustion, but to moderate fatigue, is essential in that it establishes nervous and muscular vigor.

THE CO-OPERATION OF PHYSICIAN AND SURGEON IN THE AFTER-TREATMENT OF PATIENTS.

Under this or similar heading many papers have been written pointing to the evils which befall a surgical case attended unaided by the medical man, and the equally distressing evils which befall him who is truly medical when treated by a surgical man. The unfortunates in the latter case are comparatively few since the surgeon does not largely occupy himself with those who either really, or in his mind, do not give a fair promise of benefit from some form of operative intervention. The surgical cases in the exclusive hands of medical men become fewer, incident partly to the increased skill of surgeons, partly to popular education, and mainly to the greater diagnostic ability of the internists of to-day.

The discussion concerning coöperation of the two branches of the profession has had to deal in the past mainly with that period of time preceding operation. Therefore it is somewhat novel and highly desirable to

have some light thrown upon the fate of the patient who has been first treated by an internist and afterwards by a surgeon following operation. This matter is taken up by Goodman and Speese, representing respectively medicine and surgery (*Pennsylvania Medical Journal*, May, 1917). They note that the usual plan followed in many hospitals after a patient has been transferred from the medical to the surgical side is for the physician to efface himself from all relationship to the patient, this particularly among ward patients, and they raise the question as to whether the physician who transfers the patient for a serious surgical procedure should complacently believe himself to be free from further responsibility or should share with the surgeon many of the difficulties arising from the postoperative care of the patient. They hold that the proper diet for a patient who is undergoing an operation for a gastrointestinal condition is determined only by consideration of the morbid process, the type of operation, the individual's idiosyncrasy toward certain foods, and his gastric and intestinal chemistry. They therefore contend that the routine of prescribing liquid, semiliquid, soft, select, house, or whatever the diets are named in the various hospitals, to all patients regardless of the gastrointestinal condition is most undesirable. Moreover, many of these patients require as much attention from the dietetic as they do from the surgical point of view.

It is unfair to the patient to discharge him from the surgical ward, believing him to be cured, and neglect to instruct him as to his mode of living for the ensuing twelve months or even longer. It is stated that comparatively few cases of duodenal ulcer are immediately relieved by operation, and that, if the surgeon could have an opportunity of seeing these cases immediately following the operation, he would be chagrined at the patient's recital of his physical troubles. Gastric and duodenal ulcers are acute conditions in which postoperative success is frequently wanting. While appendectomy, gallbladder operations, resections, plastic operations on the stomach and intestines are operative procedures from which immediate benefit may be secured, the ultimate results are largely influenced by continued skilled medical care.

No patient is really cured at the end of a month's sojourn in the hospital, after undergoing an operation for any abdominal surgical condition. For a long time during the reconstruction or readjustment period he should be regarded as a patient and treated as such; the burden should be borne entirely by the family physician. The patient should be required to report at regular intervals to his physician, even though he believes himself to be in perfect health.

If the case be one of gastroduodenal ulcer, as long as blood is present the patient should be treated as an ulcer case. If blood has been absent and again reappears, the above holds good. Hamburger and Leach have strongly accentuated the fact that nonrelief through surgical interference in gastric and duodenal ulcer is due to a lack of properly placed surgical indications; lack of thorough and prolonged preoperative medical treatment; failure to devise the proper surgical procedure to meet the individual case, and lack of prolonged postoperative medical treatment.

Lichty states that in nearly 10 per cent of his cases referred to surgeons the same symptoms were present after operation as before, and that some of these results could have been avoided if there had been care and supervision of the patient on the part of the medical man after operation.

THE FIRST DRESSINGS FOR WAR WOUNDS.

Since on the first dressing applied to a wound depends so largely its subsequent course and the fate of the human unfortunate enough to have been injured, it seems strange that neither war nor accumulated experience has yet enabled a group of intelligent men to unanimously agree upon any one particular form of first aid. The wounds acquired in industrial establishments, often not largely infected, usually

wide open, and treated by skilled surgeons almost immediately, may very properly have applied to them as an immediate protector against further contamination dry sterile gauze secured in place by a bandage. To war wounds inflicted by bombs and bursting shells, always devitalized, often tremendous in extent, and practically always and deeply and virulently infected, the application of dry sterile gauze firmly secured in place by a bandage might be admissible were it promptly removed, the wound cleansed of foreign bodies, made accessible in its deepest parts to antiseptic washes, and subsequently either continuously laved by an antiseptic solution, at the present writing preferably the Dakin, or adequately and completely drained. Dry sterile gauze placed on such a wound and retained for hours, perhaps days, is certainly in many cases not only futile, but absolutely harmful, acting as a plug to retain infection under pressure and becoming a contributing factor to subsequent complications such as gangrene, hemorrhage, and general septicemia.

The underlying principle of all first dressings, certainly in military surgery, is to the effect that each soldier should have one, should part with it to no other, and should immediately apply it to himself or have this done by a comrade. The first dressings supplied to the troops vary. There is surely a best, and probably this best is not to be found at any front. As a part of the medico-military preparation for the part which our own men shall take in settling this conflict, the study of the best first dressing is of vital importance. It must obviously fulfil certain conditions.

1. It must not seal against drainage.

2. It must be protective against further contamination either by contact or through the medium of insects.

3. It should be strongly antiseptic, but neither toxic nor devitalizing to lesions.

4. It must occupy comparatively small space in the soldier's outfit, must be so secured to his accoutrements and sealed that it can neither be lost nor used for purposes other than those intended. It must be sealed against dirt or the loss of its antiseptic powers.

The form of this package and its constituent parts should be determined promptly by an intensive study utilizing for this purpose the material afforded by the great industrial plants and the skilled surgeons in charge of them, and the large accident clinics in our great hospitals. When the apparently ideal first dressing is determined upon, it should be used by troops now fighting in the front.

Various trials and comparisons made with iodine, with sterile gauze and carbolic acid have proven nothing; this possibly because the fundamental principle of drainage, or at least freedom from tension, has not been observed in the trials of these first-aid packages. There are certain new and powerful antiseptics, some of which are neither destructive to living tissues nor materially interfere with phagocytosis. Among them may be named Dakin's latest preparation dissolved in eucalyptus oil and properly weakened by paraffin oil; Schamberg's mercurophen, non-toxic, comparatively unirritating, and experimentally far more potent than bichloride; and flavine. Nor is the soap dressing without its warm advocates.

Bull's recent work with the gas bacillus and his demonstration of its toxin or toxins and his elaboration of the antitoxins, which in laboratory trials have been entirely efficient, give at least a promise that this menace to the wounded may be lessened if not entirely removed.

If each man in the American army can carry with him a first-aid package, which instead of complicating the further course of his wound makes its healing more prompt and assured, he will have given an example of medical efficiency greatly to the credit of our profession.

REPORTS ON THERAPEUTIC PROGRESS.

TWILIGHT SLEEP.

The Prescriber for April, 1917, states, what we in this country well know, that the application to obstetrics of scopolamine-morphine anesthesia, under the popular though inaccurate title of "twilight sleep," has been so freely referred to, and so enthusiastically "written up" by the lay press, that patients are demanding of their medical men to have it. Like all popular movements there is a certain value in the method, but it has been clearly demonstrated by this time that while it has its place, it is not to be used as a routine method. In the first place it appears to be untrustworthy; it acts beautifully in some cases, and is of very little use with others. Secondly, it is most dangerous to the child if the latter be born while there is still plenty of narcotic in the maternal blood stream. It may require prolonged artificial respiration to bring the child to life. Thirdly, it abolishes memory rather than pain; that is to say, the mother suffers, or may suffer, just as much as with the older methods, but she remembers nothing about it.

In connection with this last feature, we would quote from a letter recently received from one of our readers, a medical practitioner in the Midlands. "A mother discussed with me," he says, "the price of coals and many other things. Told me each time she had a pain, and that the injection had not relieved her of her pain. She showed natural anxiety when the baby had to be roused by artificial respiration. Next day, however, she knew nothing about the events of the previous afternoon, not even at what time I had called to attend her. Naturally, she thinks that she had a splendid time, felt nothing, and so forth. Now she is advising all her friends to have 'twilight sleep.'"

A valuable symposium on the subject of "Twilight Sleep" appeared in the *Practitioner* for January of this year and was abstracted for the THERAPEUTIC GAZETTE. The contributors were all obstetricians of wide experience, and most of them regarded the loss of memory as the primary object aimed at in the treatment. One writer emphasized the necessity for purity and reliability of the drugs used. Sir Halliday Croom said that he has not met with any contraindications, nor with any accident either to mother or child, either in hospital or private practice, but this is not the experience of others. On the whole, the method appears to be justified in certain cases, and its action is by creating loss of memory. Mr. J. S. Fairbairn, one of the contributors referred to, said that it entails constant watching of the patient by skilled nurses and frequent visits by the practitioner. "Indeed," he adds, "the requirements are such that it would probably be advisable for the patient to go to a nursing home within easy reach of her medical attendant. It certainly involves greatly increased expense to the patient, and it appears that the induction of the so-called 'twilight sleep' will be a luxury only for those willing to pay for it."

THE TREATMENT OF PERNICIOUS ANEMIA.

LARRABEE in the *Boston Medical and Surgical Journal* of April 19, 1917, in concluding an article on this topic admits that it is still unfortunately true that we do not know the cause of pernicious anemia and that we must still regard it as invariably fatal. We have, however, learned much concerning its pathogenesis. We can by various methods give its victims a small measure of relief and a little longer lease of life. There is no one measure or method of treatment that is always indicated in every case. We must, at any moment, choose for the case in hand the means best adapted to meet the indications of the moment. So far as we can speak of a systematic treatment, it is in the writer's opinion something as follows:

Every case should receive arsenic, best administered continuously by the mouth. If

the Wassermann reaction is positive or if there is other evidence of syphilis, salvarsan should be used. Iron should seldom be given except during recovery from relapses, where the increase in red corpuscles outstrips the increase in hemoglobin and the blood-picture approaches that of benign anemia. The diet should always be carefully regulated with a view to controlling protein putrefaction and intestinal indigestion, and preserving the nutrition. Hydrochloric acid and other aids to gastric digestion should be used freely. When the anemia is rapidly increasing the careful use of catharsis and regular and thorough lavage of the colon and perhaps also of the stomach is in order. If the anemia still progresses, and especially in hemorrhagic and aplastic states, transfusion, best by Kimpton's tubes, should be done. If one or more transfusions are not followed by remission, it is justifiable to remove the spleen.

ABDOMINAL KNEADING IN THE TREATMENT OF INTESTINAL STASIS.

Bolton in the *British Medical Journal* of March 31, 1917, points out how important it is to prevent the stasis of food in the large intestine through the use of purgatives and paraffin, and the popularity of the douche for washing out the large bowel; nevertheless it is to supplement these remedies that abdominal kneading is recommended.

The patient, after being carefully instructed, can carry out this treatment for herself. Lying in a warm bed, in a comfortable position on the back, so as to relax as far as possible the abdominal muscles, she must place both warm hands, with fingers flat, upon the abdomen over the position of the cecum. Gentle but firm pressure must now be made, gradually getting deeper and deeper as the muscles relax and the contents give way. The pressure must be made backward and upward, and must be continued at this spot for at least two minutes. The contents cannot be easily driven back into the small intestine, and will therefore be impelled forward. The hands, still pressing deeply, are made to follow the contents up the line of the ascending colon.

The next movement has for its object to assist the passage round the hepatic flexure. For this purpose the fingers of the right hand are placed at the right loin, in the cleft between the lower ribs and the hip-bone, and pressed firmly forward. The left hand is placed at a corresponding spot on the front of the body and pressure brought to bear so that the bowel is squeezed between the two hands and emptied of its contents. The pressure may be relaxed and repeated several times. The gall-bladder must now be manipulated. The tips of the fingers of both hands are forced under the ribs at the position of this viscus and pressure brought to bear upon the fundus. A very efficient instrument for this treatment of the gall-bladder is the electric vibrator.

Deep kneading is now applied over the transverse colon, pressing toward the spleen. The splenic flexure is treated in the same way as the hepatic, but it is far less important. Indeed, the only other important part to treat is the sigmoid flexure, and here the pressure must be exerted downward. The patient should treat herself after getting to bed at night and again before rising in the morning, spending fifteen to twenty minutes in the process. Steady pressure and great patience are necessary if any success is to be obtained. Much of the treatment recommended can be carried out by the use of a heavy ball of shot, which is very slowly rolled over the abdomen following the direction of the large intestine.

The most obvious effect of the kneading is the passage of flatus, which usually occurs while the treatment is in progress. This is frequently followed later on by an action of the bowels.

In deciding what cases require this treatment, one naturally thinks first of constipation, biliary catarrh, and dyspepsia. But intestinal stasis is often present where it is not suspected, and a careful examination of the abdomen should be made in every

case of chronic illness. It may be at once obvious on inspection that the right side of the abdomen is more distended than the left. Through the parietes of elderly women elevations can sometimes be seen showing the position of lumps of hardened feces beneath.

Palpation will clear up any uncertainty in the diagnosis. Of 156 patients in whom the abdomen was examined at the Electromedical Hospital, Nottingham, tenderness over the cecum was present in one-third. Most of these were suffering from some form of rheumatism or from neuritis. In many the tenderness disappeared after a short course of treatment, and in none did any harm arise from the kneading and electricity applied.

In elderly persons in whom the tone of the muscular fiber is lost, difficulty is experienced in bringing about a healthy action of the bowels; they suffer from chronic retention, and when the bowels are relieved by purgatives there is inability to retain the liquid motion. For these cases abdominal kneading with electricity is useful.

Many persons in ordinary health are subject to occasional attacks of heaviness or depression. They arrive at their office only to find that the head is not clear and work is an effort. In the course of an hour the head will become clear and all the unpleasant depression pass away. Early morning headache is caused by poisons absorbed from the abdomen, and is relieved by kneading, even when there is no constipation. Diarrhea is due in many cases to fermentation in the cecum. The overflow gives the mistaken impression that there is no stasis. Kneading is often of service in this condition. No case of mucous colitis should be considered incurable until kneading has been thoroughly tried, while paraffin is being given internally.

A very troublesome condition, often accompanied with much pain, is that due to adhesions following operations on the abdomen. Kneading, with radiant heat and electrical treatment, will bring about a good result if persevered with.

It is not in chronic diseases only that this treatment is useful; the doctor called in to an emergency case of flatulent colic can relieve his patient in a few minutes by this method.

THE ACTION OF STRYCHNINE IN CERTAIN TYPES OF CARDIAC IRREGULARITIES.

In the *Journal of Pharmacology and Experimental Therapeutics* for April, 1917, M. I. SMITH reaches the conclusions from laboratory investigations:

1. Strychnine is shown to have depressant action upon the excised heart of the frog and the rabbit. It slows the rate, and lessens the amplitude and irritability of the heart.

2. Strychnine in sufficient concentration may delay or prevent the irregularities produced in the isolated heart by aconitine, by ouabain, and by occluding certain branches of the coronaries. This is shown to be due to strychnine lessening the enhanced irritability of the heart which gives rise to such irregularities.

3. Irregularities arising from impaired conductivity (cocaine irregularity) or from excessive depression of the myocardium (apocodeine and ergotoxine irregularities) are aggravated by strychnine.

4. It is suggested with the greatest reserve that strychnine may have a place in the therapy of ectopic beats originating in the ventricles.

A REVIEW OF ANESTHESIA IN OBSTETRICS.

In the *Long Island Medical Journal* for April, 1917, POLAK and MATTHEWS publish an exhaustive review of this subject and state that the following conclusions may be formulated:

1. It must be admitted that the ideal obstetric anesthesia has not been discovered.

2. The prolongation of the second stage of labor by any method is disastrous to the child, and this is particularly true of the morphine group of drugs.

3. Various combinations of the drugs at

our disposal for the production of obstetric anesthesia have certain definite advantages, *e.g.*, pantopon with scopolamine, or morphine with scopolamine to carry the patient through the preparatory stages, and when it seems necessary, chloroform, ether or nitrous oxide gas during the perineal stage.

4. At the present time, morphine-scopolamine anesthesia for the first stage and nitrous oxide gas for the second stage of labor, would seem to be the best combination.

5. From a study of this subject, it would seem that institutional obstetrics must be accepted as a recognized specialty, and that the judicious use of anesthesia, though not without its dangers, is destined to be classed among the obstetric arts.

RESUSCITATION OF APPARENTLY DEAD INFANT.

To *Northwest Medicine* for April, 1917, COUCHE contributes this report:

Last summer he was called to attend a case of midwifery. He got there five minutes after the baby was born and found the cord had been prolapsed for fifteen to twenty minutes before birth, and the babe was apparently dead, eyes rolled back, and no sign of heart-beat by careful auscultation.

He immediately whipped out his hypodermic syringe and gave the child one-half Cc. of pituitrin in the left hip, followed by immersion in a bath of warm water up to the chin, and commenced traction on the tongue. In fifteen minutes he listened to chest and heard the heart give a distinct impulse. Fifteen minutes later he gave it 1/240 grain strychnine in the other hip. He listened to heart and counted an impulse of 15 to the minute. In two hours he gave a small dose of digitalin in shoulder. Counted pulse about this time and heart-beat was 130 per minute. The babe cried lustily in the meantime, and he handed it to its mother to nurse.

Couche thinks that some one in like circumstances may find this interesting. The idea is not original, as Couche read of a case of a woman dead before child was delivered, in which pituitrin, injected in the stump of the navel, started the heart beating.

INFANTILE DIARRHEA PROPHYLAXIS.

In the *New York Medical Journal* of July 14, 1917, ZIERLER reminds us that breast-fed infants will come through hot summer months if such simple measures as cleanliness, fresh air, regularity in feeding, and quiet are observed. The importance of maternal nursing is obvious and should be encouraged. In over ninety per cent of cases of summer diarrhea the artificially fed infant is the one attacked. The importance, therefore, of proper mixtures of percentage feeding and the supply of pure, uncontaminated milk becomes obvious. The infant who is fed on a proper formula, gaining steadily, and who is free from gastric disturbances prior to the advent of hot weather, will in the majority of cases come through the hot summer months with very little disturbance. On the other hand, an infant carelessly fed on patent foods or unsuitable modifications of cow's milk will in the majority of cases fare badly. The high mortality among infants from diarrhea is undoubtedly among this class of carelessly and unscientifically fed cases.

Milk intended for infant use should be thoroughly supervised by the health authorities and should conform to a certain standard. During the hot months the milk should be pasteurized or sterilized, bearing in mind, however, that neither process will render inert the product of bacterial growth in a dirty, contaminated milk. The proper handling of the milk after it reaches the house should be impressed upon the mother. It is remarkable how often some of the worst cases of diarrhea will show rapid improvement when put on a suitable formula of clean, pasteurized milk. Intelligent feeding and the proper milk supply, therefore, cannot be too strongly emphasized as the most important prophylactic measures at our command. A bottle-fed infant should be placed on a proper formula of

percentage feeding from the very outset, and remain under the supervision of the physician throughout the nursing period, the formula to be changed from time to time to meet the individual requirements. The directions to the mother for the preparation of the mixture should be simple and explicit, and the physician should satisfy himself that his instructions are carried out thoroughly.

THE NATURE AND PREVENTION OF SHOCK.

The *British Medical Journal* of March 24, 1917, in discussing this subject editorially says that, as to treatment, the importance of prevention must be insisted upon, and it is pointed out that an antecedent hemorrhage, insufficient in itself to produce collapse, may be an important factor in the subsequent onset of shock, in so far as it is due to deficient volume apart from increased viscosity of the blood. The normal reaction to simple hemorrhage sufficiently large to diminish the output of the heart and lower the blood-pressure consists in the abstraction of fluid from the tissues until the volume of the blood is again adequate. The experiments which have been reported suggest that this restorative reaction fails in shock, and that the fluid continues to pass from the blood, even though the arterial pressure has fallen to a very low level. A relatively small hemorrhage, therefore, may have a serious influence in determining the onset of shock. Other causes tending to diminish the blood volume—such as fatigue, exposure, or prolonged abstinence from food and water—are well recognized by military surgeons as tending to shock; but it may be that sometimes measures preparatory to operation in hospital, such as free saline purgation and strict abstinence from food and water, may contribute to the danger. At any rate, they believe it to be true that the experience of the casualty clearing stations in this war is that exactly the opposite line of treatment must be followed in attempting to restore a patient sufficiently to withstand an operation; and so far, therefore, clinical practice has anticipated the experimental conclusion that a free supply of fluid, by infusion of physiological saline into the rectum or the subcutaneous tissues, must be begun before operation.

The only drug which can be used with any advantage when shock has once developed is pituitary extract, which causes a prolonged and general contraction of the arterioles, thereby diminishing the total capacity of the circulatory system and mitigating the effect of a deficient blood volume. The use of adrenalin, apart from the fact that its effect is fugitive, is open to objection. In place of the injection of physiological saline in fully developed shock the use of intravenous injections of hypertonic saline is suggested in the manner found valuable in the treatment of collapse of cholera and dysentery; the addition of calcium chloride to the solution is proposed, inasmuch as it has been found that calcium ions have a specific action in reducing abnormal permeability of capillaries. The aim in the treatment of shock should be to restore the volume of blood in effective circulation and at the same time to reduce the abnormal viscosity. An incidental effect of failure of the circulation is the defective oxidation of even the arterial blood, a fact which suggests that inhalations of oxygen may have some value.

CLINICAL OBSERVATIONS ON DYSENTERY.

The *British Medical Journal* of March 31, 1917, contains an article by EVANS in which he records his experience in the Indian medical service. He well points out that the symptoms of dysentery vary according to the type of infection and according to the acuteness of the disease. In all forms the most important symptoms are the frequency and character of the stools and the degree of tenesmus. From these the severity and progress of each case must be judged. The temperature runs no special course, but as an aid to treatment it must not be overlooked. In severe acute cases it may run up to 104° or 105° F., while in

others it may be subnormal. In the latter type of case there may be varying degrees of collapse, which should be treated accordingly.

The disease in some cases begins as simple diarrhea; in others the onset is sudden, with frequent stools containing varying quantities of mucus and blood, with colicky pains in the abdomen. Tenderness over the descending and sigmoid colon is also a frequent sign.

In severe cases the fecal elements in the stools soon disappear, and the patient passes large quantities of mucus tinged with varying proportions of blood. In some cases after a few days there may be no trace of blood to the naked eye, while the patient may pass frequent motions containing large quantities of purulent mucus.

Tenesmus as a rule is not very marked in the bacillary type, and may be absent altogether. This is the symptom which is almost characteristic of amebic dysentery. In severe cases it may be so intense that the patient dare not leave the commode, while the pain and straining may bring on a certain degree of collapse. All the patient passes in such a condition consists of very small quantities of blood-stained mucus.

It is extremely important amongst troops that every case of diarrhea, however mild, should be promptly treated and checked. Each one should, if possible, be admitted to the hospital and the stools rendered innocuous. Simple diarrhea frequently goes on to dysentery unless treated in time, especially in localities where the disease is endemic.

All cases of dysentery should have absolute rest in the recumbent position. Evans has found that when cases are allowed to walk about recovery is greatly delayed.

The diet should be very sparing and should consist at first of nothing but barley water or rice water; later milk may be given, but should the milk be passed undigested, whey should be given instead or a few grains of sodium citrate added to each pint, and the result watched in each stool. The less soups and broths given the better. Kumiss or sour milk is an excellent diet and can easily be made anywhere in the East. A few spoonfuls of dhai or leban are obtained from the nearest village and put into fresh or sterilized tinned milk. It is then kept at an equable temperature for a few hours, when it is ready for use. The time varies with the degree of activity of the culture of the lactic bacillus obtained and the temperature at which it is maintained.

As the patient progresses, rice thoroughly boiled in water is the best solid to begin feeding with. It is easily digested and does not contain too much starchy matter like sago, arrowroot, etc. Great care should be taken with the dieting, and the importance of personally examining every stool passed by the patient cannot be sufficiently emphasized. From this inspection only can the diet be regulated.

Soldiers frequently, when they are progressing favorably, complain about the meager diet they are getting, and to supplement this sympathizing friends from the lines may attempt to supply them secretly with all kinds of indigestible foods; a relapse is the usual consequence. The medical officer by examining each stool holds the master key, and can act accordingly. Malingerers can be caught out in this manner. Instances have occurred where the patient had deliberately kept up the symptoms by eating unauthorized foods so as to be sent back toward the base.

To prevent the spread of the disease from infected stools, each stool should be protected from flies and destroyed whenever possible by incineration; should this be impossible, then it should be rendered innocuous with one of the various disinfectants.

All cases of acute dysentery coming into hospital were given 2 drachms of magnesium sulphate every two hours until the stools became feculent or until 2 ounces had been given. This was done as a routine measure unless the dysentery was of the amebic type.

This method of treatment with rest and dieting has proved in Evans's experience to be most satisfactory. If there was no improvement from this, the patient was then given bismuth salicylate and salol ää 10 grains three times daily for three or four

days, and at the end of this again went through a course of the magnesium sulphate treatment. This salt acts mechanically by ridding the patient of the bacterial and other débris in his intestinal canal, and possibly also by virtue of its lymphagogic action may draw into the intestinal canal any antitoxins that may have been found in the patient's blood.

With this treatment in the field ambulance it was found possible to return to duty within fourteen days 90 per cent of the cases of dysentery which occurred amongst the Indian troops at Anzac.

Should the patient have intense pain, hot fomentations applied to the lower part of the abdomen will frequently relieve it; otherwise, 10 minims of camphorodyne or 10 grains of Dover's powder will be found to act satisfactorily.

The promiscuous injecting of emetine in every case of dysentery is distinctly harmful. The results are very disappointing, and one's faith in its specific action in amebic dysentery is apt to be shaken. It should only be used in those cases that are distinctly amebic in type, or in which the entameba has been discovered in the stools. Emetine was found to have little effect in cases of mixed dysentery until the patient had gone through a course of the saline treatment first, when it had the same marvelous action as one observes in India in cases of simple amebic dysentery.

The injection of emetine should not be done indiscriminately, and the result of each injection should be carefully observed. In suitable cases a grain should be injected subcutaneously night and morning. If no good results occur after four injections, it should be stopped, on account of the depressing influence it exerts. It can be resumed after a few days' interval if thought necessary.

Chronic dysentery is a far more difficult and intractable condition to treat. The results of medical treatment in bad cases that have persisted for several months have proved to be very unsatisfactory. The majority of chronic cases are by no means simple infections, other intestinal micro-organisms step in as soon as the bowel becomes seriously damaged, and a state of chronic toxemia arises.

Evans is indebted to Major E. F. Sealy, I.M.S., for permission to observe a large number of cases among the Turkish prisoners of war that were in his charge. From post-mortem examination of the large intestine in a few cases that died, his conviction that medical treatment has very little influence on the progress of the disease was verified. In practically all cases examined the whole of the large intestine was an abscess cavity with extensive ulceration and in parts total destruction of the mucus membrane. Where an attempt had been made at repair the intestinal wall had become converted into dense fibrous tissue, which would in time have formed strictures and have been liable to break down on the slightest injury. The pus, which lined the whole mucous lining, was very foul, and it was evident that the bacillus coli took an active part in helping to bring about the condition. The immediate results of appendicostomy and washing out the large intestine with ordinary eusol solution were excellent. Though all cases operated on by Major Sealy and Evans were in an extremely debilitated condition, and some were actually scorbutic, the shock from the operation itself was *nil.* The lavage was done night and morning through a fine rubber catheter, and fully two quarts of eusol solution allowed to pass. The patient experienced no pain or inconvenience, and the fluid was passed by the rectum within ten minutes or so. The fluid passed cleared away all the foul débris in the large intestine, and absorption was prevented, the stools that were passed were rendered far less foul, the septic appearance of the patient improved wonderfully, and the temperature came to normal. Difficulties arose later owing to the appendix contracting and to the skin wound closing up. This operation gives good results for a time, but they are not maintained. Relapse is almost certain to occur, the reason, in Evans's opinion, being that it does not provide the necessary rest for the large intestine.

The ideal treatment in such cases would be an ileocolostomy with appendicostomy and lavage. It is only in this way that the bowel can have the required rest. The injection of emetine in cases in which the entamœba histolytica is proved to be present should be carried out; of its specific action on the entameba there is no doubt; still its action on the ulcerative and septic changes in which at this stage other organisms are taking part is *nil.*

A STUDY OF ETHYLHYDROCUPREIN (OPTOCHIN) IN THE TREATMENT OF ACUTE LOBAR PNEUMONIA.

In the *Archives of Internal Medicine* of April 16, 1917, MOORE and CHESNEY make a report upon the clinical use of ethylhydrocuprein. They think that on the basis of the evidence presented in this communication the following suggestions may be made for the use of the drug, although the observations are too few in number to permit of dogmatic statements:

1. It would seem, as far as present knowledge goes, that optochin hydrochloride is best administered by the mouth in acute lobar pneumonia. (The drug is preferably given in capsules, because of its bitter taste.)

2. The drug should be administered in such amounts as will insure the rapid production and more or less constant maintenance, within the blood stream, of a concentration sufficient to exert bactericidal action on the pneumococci.

3. To achieve this result, the total amount of optochin given by the mouth per twenty-four hours should bear a definite relationship to the body weight of the patient, namely, at least 0.024 gm. of optochin hydrochloride per kilogramme of body weight. (It is possible that, after one or more days' administration of the drug, less amounts may suffice owing to retention or accumulation within the body.)

4. To secure the rapid production of bactericidal action in the blood stream the initial dose should be larger than the subsequent ones, the body weight relationship being at all times preserved.

5. The individual dose should be given regularly throughout the treatment and the intervals between the doses should, in general, not exceed two or three hours. Thus, in the case of individuals of average weight, say of 62 kg., 0.024 gm. per kilogramme of body weight per twenty-four hours would mean a total of 1.5 gm. of the drug per twenty-four hours.

First 24 hours of treatment	Initial dose of 0.45 gm. Interval of three hours Seven doses of 0.15 gm each, with an interval of three hours between each two doses	Total 1.5 gm.
Subsequent periods of 24 hours each	Ten doses of 0.15 gm. each, with an interval of about 2½ hours between each two doses	Total 1.5 gm.

When the patient is below average size, the utilization of the same body weight relationship should insure the production of the bactericidal action in the blood stream; such patients require a smaller total quantity of optochin per twenty-four hours than patients of greater weight. For example, a patient weighing 42 kg. should require only 1.0 gm. of optochin per twenty-four hours. The size and spacing of the individual doses in such a case are indicated in a succeeding paragraph.

When the patient is above average weight, in order to preserve the desired relationship between the amount of the drug and the body weight, more than 1.5 gm. must be given per twenty-four hours. Thus, a patient of 80 kg. would receive a total quantity of 1.9 gm. per twenty-four hours. Whether this comparatively large dose is safe or not, they cannot say. The possibility of untoward effects should always be remembered not only when such larger total daily doses are used in larger patients, but also in the case of small or average-sized persons, even though the body weight relationship be maintained. In the use of the drug impairment of vision should be carefully looked for, and the drug should be discontinued, or at least reduced in amount, on its appearance. Daily ophthalmoscopic examinations might be advantageous.

Experiments *in vitro* have shown that the pneumococcidal action of optochin is manifest in very high dilution, and that the con-

centration required for the production of bactericidal action is not much greater than that which produces inhibition of growth. If an average-sized individual, say of 60 kg., receives 1.5 gm. of optochin, and a large individual, say of 80 kg., receives the same dose per twenty-four hours, the former would get 0.007 gm. of the drug per kilogramme of body weight per twenty-four hours more than the latter, an amount which the authors, from their experience of the drug *in vitro*, would expect to be sufficient to replace mere inhibition by actual bactericidal action in the serum.

The present study comprises too few cases to permit of final decision regarding the optimum dosage of the drug or its value in the treatment of lobar pneumonia; these points can only be ascertained when a much larger series of cases is available for analysis. The following conclusions they think are justifiable:

1. Variations in the concentration of ethylhydrocuprein (optochin) hydrochloride in normal horse serum are evidenced by corresponding variations in the degree of inhibitory and bactericidal power on pneumococci, when the drug is allowed to act on these microörganisms in the test tube at 37° C.; the degree of the specific inhibitory or bactericidal power of optochin-containing serum gives an indication of the concentration of optochin present.

2. The members of a four-hour bouillon culture of pneumococcus are more resistant to the action of optochin than those of a twenty-hour culture.

3. The use of "young" (four to six hours at 37° C.), actively growing bouillon cultures of pneumococci in bactericidal tests affords a more delicate index of the differences in the degree of inhibitory or bactericidal action of different concentrations of optochin than does the use of older (twenty hours at 37° C.) cultures.

4. As judged from the present series of thirty-two cases, when optochin hydrochloride is given by mouth to patients suffering from acute lobar pneumonia in such amounts that they receive at least 0.024 gm. per kilogramme of body weight per twenty-four hours, and when the size and the spacing of the individual doses are adequately regulated, a specific pneumococcidal action appears in their blood within a few hours, and it can be maintained more or less constant for several days.

5. In order to maintain the bactericidal action in the blood at a constant level the intervals between the individual doses given by mouth should not ordinarily exceed two and one-half to three hours.

6. When optochin is given by mouth according to such a scheme of dosage as outlined, the evidence points to some retention or accumulation in the blood of part of the drug absorbed.

7. Administration of optochin hydrochloride by mouth appears to be more satisfactory than intramuscular administration. Further study of intramuscular administration appears to be desirable.

8. Pneumococci, not only *in vitro*, but also in the human body in patients treated with optochin, may acquire the property of more or less complete resistance or "fastness" to the drug.

9. Toxic symptoms, such as tinnitus, deafness, amblyopia or amaurosis (retinitis), may be observed in the use of the drug in man; they are generally transient. Retinitis, however, may result in more or less permanent impairment of vision.

[The statements in 8 and 9 are of great importance, particularly the last line in paragraph 9. This would seem to raise grave doubt as to the wisdom of using this drug.—Ed.]

RESULTS OF SCOPOLAMINE-MORPHINE TREATMENT DURING LABOR IN 150 CONSECUTIVE CASES.

In the *British Medical Journal* of March 17, 1917, Greenwood first speaks of the effects on the child and says that as, perhaps, no symptom has given rise to so much misgiving as oligopnea he proposes to set out his experience of it. If the treatment is administered as it should be (with the admittedly attendant watchfulness it demands) there is no need whatever for so deep a grade as to produce "blue babies." A

slight degree of oligopnea is certainly not uncommon, though its incidence diminishes with the increased experience of the operator. Marked and persistent cyanosis points to an error of technique or of judgment.

The slight oligopnea to which he has referred is characterized by the following features: An initial cry at the moment of expulsion, immediately followed by a marked quietude which may persist even for an hour; if the respiration is altered at all it is a little slower and perhaps a little shallower; heart-beats continue vigorous and normal in every respect; the child simply seems lazy or tired.

Of the 150 cases under consideration, 23 (15.33 per cent) showed this slight oligopnea. But of these 23 cases, three had a second small dose (grain 1/12) of morphine—a practice Greenwood has long since abandoned. Omitting these three cases we get 13.33 per cent of slight oligopnea. Early in 1916 he used eutocine (the detoxicated morphine of Lauret) in four cases with very small doses of scopolamine; in each of these cases the infant was slightly oligopneic, and this certainly suggests more than a coincidence, especially as the only three cases in which a second dose of morphine was given showed the same tendency. Of the above 23 cases, therefore, 16 were treated exactly as is his present procedure. This gives a slight oligopnea in 10.66 per cent.

The average time the above 23 cases were under treatment was 6 hours 39 minutes; omitting the three cases in which morphine was given twice and the four cases in which eutocine was used, the remaining 16 were under treatment 4 hours 45 minutes. This, Greenwood is convinced, contains the whole philosophy of oligopnea; if it is to be avoided altogether, morphine should certainly not be given late in labor; or, if given, the morphine should be proportionately diminished in dose. The average length of time during which the cases in his series presenting no oligopnea were under treatment was 7 hours 35 minutes. The cases in which the infants were at all oligopneic, it will be seen, were the cases of short duration. This clearly indicates that oligopnea is due mainly, if not entirely, to the morphine. Greenwood is not suggesting that this slight degree of oligopnea is critical, for he has intentionally refrained from interference, though prepared to resort to artificial respiration if necessary, but the condition of the infants was never alarming. Only in two cases has he resorted to artificial respiration—one a difficult forceps extraction, and the other a case in which the cord was three times round the neck of the infant. Both cases recovered.

Considering the effects on the mother he states he has made it a constant practice to begin this treatment early, often as soon as labor had definitely begun. In a few of the cases there appeared to be slight retardation of the uterine contractions after the initial dose, but after it only. His experience has been that after the second and subsequent doses the contractions have become normal, and in not a few cases really severe. He feels justified in saying this has probably quickly regained the little time that may have been lost, and therefore labor on the whole has not been retarded. Possibly, in the few cases in which an initial delay appeared to occur, there was present some slight idiosyncrasy to morphine.

Perhaps the most striking after-effect on the mother is the remarkable absence of exhaustion and shock. After a labor lasting twenty-four to forty-eight hours or more the patient will often sleep a few hours, and on awakening be astonished that labor is over, and have such a feeling of well-being that she cannot realize anything has occurred.

So long as complete amnesia, and not analgesia, is aimed at and maintained, Greenwood has no hesitation in saying his experience proves that there is no risk either to mother or infant. If pushed to the slightly further stage of analgesia the risk may be grave; but as the margin between amnesia and analgesia is small, the necessity for constant watchfulness by the obstetrician is all the more emphasized.

The influence on the pulse is interesting. In 11 2/3 per cent of the above 150 cases the pulse-rate was increased; in 36 per cent it remained the same; in the remaining 52 1/3 per cent it was diminished. In all the cases except two the character of the pulse was at least as good as at the onset of labor; usually it was improved. The two exceptions were cases complicated by influenza and an acute attack of cholelithiasis respectively.

While Greenwood's observation may not be of any particular technical interest, it is certainly of some moment from a national point of view at the present time. In this series of 150 cases he has certain knowledge that in nine the patients had resolutely refused to entertain the idea of a child. Hearing of the scopolamine-morphine treatment they decided the time was ripe to embark upon the responsibilities of parentage. The result is an increase of 6 per cent in the birth-rate in this series. This figure three times covers the infant mortality at birth in the 150 cases, and is rather significant.

MEDICAL GYNECOLOGY.

Loop in the *New York State Journal of Medicine* for April, 1917, well says that gynecological patients usually consult their family physician, and it is he who has the first opportunity to make the diagnosis which shall put them on local, palliative, or radical operative treatment. For his guidance Loop would suggest a simple classification of his findings into congenital defects or deformities, neoplasms, infections, traumatisms incurred during labor, and the sequelæ of labor or abortion. From this list Loop would at once strike off as unsuitable for local treatment in its commonly accepted meaning all new growths, tumors of any kind or location. Even though nothing more than a urethral caruncle or small uterine polyp extruding from the external os be found, with which he may be entirely competent to cope, yet the treatment of these conditions must be considered surgical and not within the scope of this paper.

Regarding congenital deformities and fetal remains, no such sweeping statement can be made. The sterility and dysmenorrhea due to infantile uterus may often be relieved by medical and local treatment, while atresia at any point of the genital canal, septa of the vagina or uterus, or absence of any of the component organs are absolutely unsuited to these methods. Young or unmarried women suffering from these conditions are often subjected to gross malpractice because of the aversion physicians feel to examining such cases. The most classical case of atresia of the vagina which Loop has encountered had dragged out a miserable existence from puberty to marriage, with constantly increasing pelvic pain and a slowly developing enlargement in the pelvis, until the perineum was stretched as with the fetal head and the rectum was almost entirely obstructed before an examination disclosed the real nature of her distress. We must not allow our modesty to interfere with our duty. As for the patients, such a sufferer has no modesty left; her sole thought is to be relieved.

Infections from the standpoint of treatment must be subdivided into acute and chronic types, the nature of the infecting organism, whether the gonococcus, streptococcus, the colon group, or what not, and also the point of attack must be considered. Vaginal, urethral, or bladder infections and puerperal infections of the uterus, almost a crime in our day, should be met with prompt and vigorous resistance. Acute infections of the tubes, pelvic peritoneum, and cellular tissues are best treated by palliative measures, watchful waiting, not unmindful of vaginal douching and vaginal puncture. Many of these cases recover by resolution, while many more, after the storm, must be treated by radical or conservative surgery. It is in this latter class of cases that much of the abuse of local treatment is seen. The family physician must know the limitations of palliative treatment and must not subject these patients to months or years of tampons, douches, and chronic invalidism.

Injuries from childbirth, neglected or unsuccessfully repaired at the time, which destroy supporting structures or leave eroded surfaces for the absorption of infection, are not properly cases for palliative treatment and should only be so managed when there exist definite contraindications for radical treatment. Other sequelæ of labor, of which subinvolution is the most frequent and has the greatest morbidity, if uncomplicated by injury, may usually be best treated by palliative means.

The management of these cases, then, hinges on accurate diagnosis, good judgment, and a knowledge of the possibilities and limitations of therapeutic measures. Loop makes no pretense to a comprehensive consideration of the subject, but wishes rather to bring attention to a few of the commonly encountered conditions which he believes to be properly and often best treated by local means, together with some methods of treatment which he has found extremely useful, but which have been more or less frowned upon by the authorities, and somewhat feared, doubted, or ignored by the profession.

Congenital deformities and diseases are often difficult of detection because so often encountered in virgins. Loop would emphasize the value of the bimanual examination per rectum in these cases especially, although it is often of great service in parous women. Local treatment of nonparous women is limited to those in whom the hymen and vagina will permit instrumentation. In the congenital classification he includes those abnormalities which have existed from birth, or which are first evidenced at puberty or after marriage and which are not neoplastic, traumatic, or infectious in origin.

Infantile uterus, when possible, is best treated by non-operative means. In addition to the usual hygienic and tonic measures, the use of graduated uterine dilators, the intrauterine application of 95-per-cent phenol or iodine, and if possible, after some progress, the use of a stem pessary, which may be left *in situ* with impunity for many months, together with the careful administration of small doses of thyroid extract, ¼ or ½ grain twice daily, has been more fruitful of results in Loop's experience than the usual curettage. It is well known that thyroid extract has a selective action on the generative organs, stimulating them to normal activity.

Amenorrhea when not due to the great physiological cause, pregnancy, or to some physical obstruction, may well be treated by much the same methods, and with excellent results. Of late, Loop has used corpus luteum instead of thyroid extract in these cases, and with much satisfaction. In the strenuous type, however, thyroid extract always has a marked effect for good. Curettage does these patients little or no good and its results are almost always temporary. Depending on some obscure fault, local stimulation, together with our feeble, groping opotherapy, seems and is far more rational than curettage. Yet many of these cases are referred for curettage. Actual physical obstruction is about the only indication for operation in these particular cases.

Dysmenorrhea is one of the most frequent complaints the physician hears, and it merits all the attention that its victim insists on, for aside from the danger of drug habits, whether as a cause or effect, it is so often associated with cystic disease of the ovaries as to be considered more than a mere coincidence. Loop is firmly of the opinion that many ovarian cysts are due to back pressure from a spasmodic dysmenorrhea. Now we are offered as our defensive weapon, dilatation and curettage, and who of us has not been disappointed in its results in, Loop might safely say, the majority of cases? Having ruled out, by careful examination, cystic disease of the ovaries, tubal disease, varicosities of the broad ligaments, etc.—*i.e.*, having arrived at a positive indication for curettage—Loop contends that the use of graduated dilators where necessary, the intrauterine application of phenol and iodine, followed by the introduction of a stem pessary, and in some cases the use of very small doses of thyroid extract, will accomplish results of a far

more lasting and satisfactory character than the orthodox treatment with the curette.

The stem pessary is looked upon with fear by many physicians. Loop has used them for many years, introducing them at the office under fairly aseptic technique, and has left them in place for as long as twenty months, with none but good results. There are a few patients with a positive indication for them in whom the vagina is so small or the cervix so tight as to preclude their use except with an anesthetic. A curious fact has been that when introduced after dilatation under anesthesia, they have invariably been expelled within a few days, even though he has tried to insure their retention by a suture of kangaroo tendon through the cervix. This shows that our rapid dilatation lasts for a short time, that the cervix does not shut down enough to hold the pessary, but a return of the old symptoms proves that it is not for long. In these cases Loop has usually been able to replace the pessary before contracture took place. Here again he wishes to emphasize the action of thyroid extract on the pelvic organs. Do not forget it in the treatment of amenorrhea, dysmenorrhea, and sterility.

Endometritis, leucorrhea, menorrhagia, dysmenorrhea—these are almost synonymous terms. In cases in which the treatment can be carried out, Loop has rarely administered an anesthetic for curettage alone, and he submits that he has had more complete and lasting results than from operative treatment. Reed was the first to recommend the use of phenol as a local application to the endometrium so far as Loop knows, and since reading his work some ten years ago Loop has used this treatment in endometritis almost to the exclusion of curettage or in connection with it where an anesthetic had to be administered for some other purpose. Graduated sounds are used where necessary, and the uterine cavity swabbed out with 95-per-cent phenol, or better, where possible, ½-inch selvage tape saturated with it is packed into the cavity and is left for twenty-four hours unless expelled by uterine contractions. A dossel of cotton saturated with alcohol is placed behind the cervix to neutralize the overflow. Appropriate tampons may be used in the vagina at the same sitting and the whole arranged so as to be easily pulled out in twenty-four hours. A hot saline douche should be used immediately after the withdrawal of the tampon and packing, and in most cases can be used to advantage every night until the treatment is repeated, which is ordinarily on the fourth or fifth day. A wide experience with these measures enables Loop to say that they may be carried out at one's office without infection, that there is no danger of toxic symptoms from the phenol, and that the results are excellent, better as a rule than simple curettage in like conditions.

FURTHER OBSERVATIONS ON THE TREATMENT OF CANCER OF THE CERVIX BY THE PERCY CAUTERY.

TALIAFERRO in the *Charlotte Medical Journal* for April, 1917, states that in his opinion Percy, who in 1912 described his method of treating cancer of the cervix with the cautery, has done more for the relief of this condition than any man so far known.

He has demonstrated that the cancer cells are killed at a temperature of 113° to 131°—while the healthy tissue is not affected. At this temperature the heat will penetrate quite a distance.

Percy has worked out a beautiful technical plan. His method of protecting the vaginal wall with the water-cooled speculum, controlling the degree of heat by the hand in the abdomen as well as the electric cautery, makes this technique extremely simple.

Taliaferro has followed this technique as closely as possible and the results have been gratifying.

Taliaferro believes that every case of cancer of the cervix should be first treated with the Percy cautery. It is surprising to see a large carcinoma with pelvic infiltration disappear after the use of the cautery. Frequently, cases which seem inoperable soon become operable under this treatment.

It is interesting to note that in sixteen cases of carcinoma of the cervix that were treated by the Percy cautery at the Mayo Clinic, later on, when a hysterectomy was done, only three of them showed cancer cells. This goes to show what a powerful effect a low degree of heat has on cancer cells.

Taliaferro has treated quite a number with a large cauliflower mass, terrible pains, and extremely foul cancerous discharge, with the uterus fixed firmly in the pelvis. These cases looked almost hopeless, but by the Percy technique it was most gratifying to see a wonderful change brought about in a few weeks. During this time the pain and discharge were stopped and the uterus became movable. The patient, likewise, picked up a great many pounds in weight.

Even if the Percy cautery was used in no other class of cases, it would be a godsend to these terribly afflicted. In cases not so far advanced, Taliaferro believes it is wise to first use the cautery, and later on, in about four weeks, to do a hysterectomy. This may not be necessary in all cases, but he believes that when an organ is once cancerous it should, if possible, be removed; as the same influences which first brought about the cancerous condition may again become active.

Some advocate the use of large doses of *x*-ray delivered through the Coolidge tube. With this, Taliaferro is sorry to say, he has had no experience, but from reports it works well in many instances.

The technique which he follows is that of Dr. Percy, who in a paper read before the Clinical Congress of Surgeons in Boston, in October, 1915, and published in *Surgery, Gynecology and Obstetrics* in January of this year, has this to say:

"Open the abdomen. Only by doing this can uterine cancer be safely and most effectively treated by the application of heat.

"Use a low degree of heat. If a cauterizing temperature is used in the heating iron, a carbon core is formed in the cancerous mass. This inhibits the dissemination of heat.

"Pass the heating head through the utero-cervical junction to the fundus of the uterus. Keep it in one position until the whole mass contiguous to the heating iron is made so hot that it cannot be held longer in the surgeon's hand when encased in a medium rubber glove.

"Apply the heat until all the structures that were fixed at the beginning of the application are freely movable. To do less than this must of necessity defeat the object of the treatment—*i.e.*, the complete penetration of all the cancer-infected area possible. Can this be done in every case? No! Can it be done in the majority of cases? Yes."

In cases far advanced Taliaferro believes it wise to first use the cautery without opening the abdomen, and at a later sitting open the abdomen and do a complete Percy application. For these cases are greatly debilitated and weakened from loss of blood, and to do a prolonged operation at this time in his judgment is not wise. He has treated two cases with a large cauliflower mass by this method, with very satisfactory results.

He believes that this should be especially done in old women who are bad surgical risks.

As previously stated, Taliaferro thinks that in the judicious use of the Percy cautery we can cure carcinoma of the cervix when not far advanced; and that it is a truly wonderful agent in the relieving of distress in those unfortunate cases who, through their own neglect or somebody else's bad judgment, have gone beyond surgical aid.

* * *

In order that this matter may be presented from both points of view we append the summary and conclusions from an article published in *Surgery, Gynecology and Obstetrics* for February, 1917, by LEONARD and DAYTON. They state that the primary effect of the Percy cautery is to cause a necrotic mass extending more or less uniformly in all directions from the coagulating point.

A mass of sloughing coagulated tissue of this type offers an ideal medium for the

growth of microörganisms. This is borne out by the sections of the two fatal cases they report. It probably will be found impossible to prevent infection around this area, and once infected the thrombosed vessels of the region may offer a ready entrance into the system. Therefore the danger of a septicemia is considerable.

They are convinced, from their short experience with Percy's method, that fatalities must have been frequent wherever this method has been used extensively, yet they have been able to find only one complete report of a fatal case in the literature, that of Boldt. This case is of particular interest to them because it agrees in all essential points with the findings in this second case, and emphasizes the probable frequency of the development of a septicemia from the infected tissue at the coagulated area. In an article in the *Pennsylvania Medical Journal* (January, 1916) Percy mentions four cases in which "post-mortem examination disclosed more or less of these lytic cells in a pultaceous mass, free in the pelvis. In one case there was easily a pint of this material." The description of the clinical picture of these cases agrees fairly well with that of fatal septicemia, and it seems possible to suppose, since blood-culture, microscopical examination, or cultures of the mass were not reported, that the four cases may have died of sepsis.

In Boldt's case, and in the two cases reported above, the Percy technique was applied most rigidly. Nevertheless, microscopic sections show active uninjured carcinoma respectively four, eight, and sixteen days afterward. In both of their cases it was found within one centimeter of the previous site of the heating iron.

1. The prolonged treatment of large carcinomatous masses by low heat may result in a rapidly fatal outcome with lesions similar to those in cases of fatal cutaneous burns.

2. The necrotic mass produced by the cautery forms a particularly favorable medium for bacterial growth. The organisms may spread to the surrounding tissues or reach the general circulation through the local thrombosed vessels. It seems probable that the greatest danger in the application of the Percy cautery is a local infection and a subsequent general sepsis.

3. Finally, the technique is ineffectual in eradicating the carcinoma. There is no evidence from these two cases that carcinoma is more susceptible to heat than is normal tissue.

NITROUS-OXIDE-OXYGEN, THE MOST DANGEROUS ANESTHETIC.

In the *Interstate Medical Journal* for March, 1917, BALDWIN asserts that there is evidence of a tendency on the part of the official medical press to suppress criticism of this anesthetic. He also claims that if the time ever comes when nitrous-oxide-oxygen anesthetists will honestly report their fatalities, when they will eliminate the advertising element, when they will reduce their fancy charges for its administration to the level of the administration of ether, we will at once find that the use of the new anesthetic will be limited to its especial field of usefulness as suggested by Ochsner—namely, to cases of acute pulmonary congestion, and of acute nephritis. To quote from the conclusion of Baldwin's former article: "With these exceptions, which make its field a very limited one, nitrous-oxide-oxygen should be looked on as the most dangerous anesthetic that can be used, even in the hands of the most experienced."

Baldwin has noted with interest and satisfaction that Bloodgood, in the December issue of Progressive Medicine, announces that at the Johns Hopkins, where nitrous-oxide-oxygen was used so enthusiastically a very few years ago, they have within the past eighteen months gradually returned to ether. He particularly condemns the nitrous-oxide-oxygen in cases in which the blood-pressure is high. In addition to this discontinuance of the nitrous-oxide-oxygen in his own clinic, he adds: "The clinics which first began the routine employment of gas-oxygen anesthesia instead of ether are beginning to swing back to ether."

THE USE OF EMETINE.

The *Indian Medical Gazette* for February, 1917, states that HOOTEN made a report on this subject to the Poona Medical Society to the following effect:

Years ago he gave a dose of 1/6 grain daily to two children of five and seven years respectively, with almost immediate success and no bad results, and he said he would have no hesitation in giving doses of 1/12 to 1/6 grain to infants, if milder measures failed.

It was clear that further evidence was required with regard to the use of emetine in adults, and still more in children. In the meantime, speaking for himself he had come to certain broad conclusions:

(*a*) In adults he considered emetine should be given at once in all severe cases of dysentery, and that in the absence of great debility, in which case a commencement should be made with smaller doses, or special idiosyncrasy, which must be looked out for, a dosage of one grain daily was safe and might be continued uninterruptedly, if desired, for about ten days. At the same time a dose of castor oil and opium (1 ounce, with 30 minims of the tincture), or a short course of saline aperients, should be given at the start. In his experience treatment for six days had usually proved sufficient.

(*b*) Most cases of what one might call dysentery, clinically, in children, in his experience, yielded to castor oil emulsion and diet. Where they persisted, in spite of such treatment, he should use emetine, in doses of 1/12, rising to as much as 1/6, in infants. In older children he should not hesitate to increase the dose, reasonably, in proportion to age.

In the above remarks hypodermic injections were understood in all cases. In conclusion he observed that many cases of dysentery were of course not due to amebæ. In these, emetine might be expected to fail, and if after five or six days no improvement occurred in an early case, it might be assumed that amebæ were not present and the drug should be stopped. In chronic cases the treatment might be persisted with longer, at intervals. Large doses of bismuth, starch, and opium enemata, lavage of the large intestine with various solutions, and other measures, might be also called for. Microscopic examination of the stools was desirable, but under ordinary conditions was often not available.

An interesting discussion followed, and Hooten in summing up said that he was glad to find that the majority of the members who took part in the discussion were practically agreed with him in what he stated, that the evil effects of emetine were not great if it was carefully employed. He thought that two cases mentioned could not fairly be taken as deaths from emetine, and that probably there might have been other circumstances which would account for fatal results. As regards doses he was of opinion that a course of one grain given hypodermically for five or six days was without any bad effects, and he thought dividing it into two ½-grain doses was inconvenient, especially in the case of private practice.

SCARLET R IN CERTAIN DISEASES OF THE CONJUNCTIVA AND CORNEA.

Writing in the *Indian Medical Gazette* for February, 1917, KIRKPATRICK states that he has found the use of scarlet R to be so beneficial in atrophic conditions of the conjunctival and the corneal epithelium that he thinks it worth while to draw attention to its value.

Scarlet R has been recommended for use in corneal ulceration, but he has found it much more effective in xerotic conditions. Its use was first suggested to him by seeing it recommended by a writer in the *Journal of Laryngology* as a stimulant to the epithelium in atrophic rhinitis.

He first used it two years ago in the case of a woman who was suffering from a very severe xerosis of the conjunctiva and cornea which had followed on trachoma. The condition was a long-standing one, both corneæ were quite dry and insensitive, and the conjunctiva completely xerotic, with shrunken fornices. Vision was reduced to the perception of large objects near the face.

Scarlet R in castor oil was dropped into her eyes daily, and in a short time Kirkpatrick was surprised at the improvement that took place. The conjunctiva softened and became more elastic, whilst the cornea became clearer and allowed watery solutions to spread over it. Eventually it was found possible to repair the fornices and she acquired useful vision.

He also found it most valuable in cases of the chronic pannus and superficial ulceration of the cornea which sometimes persists in trachoma after the conjunctiva has cicatrized.

The strength used has been from ten to forty grains to the ounce, according to the amount of reaction excited.

LUMPS IN THE NECK, WITH SPECIAL REFERENCE TO TUBERCULOUS CERVICAL ADENITIS.

In the *Interstate Medical Journal* for March, 1917, HAWES points out that the treatment of lumps in the neck naturally varies according to the cause. In all these conditions there are two methods of treatment, depending on the diagnosis. The first consists of treating the lump in the neck, and the second consists of treating the patient who happens to have the lump in the neck. In general, the treatment of these enlarged glands may be summarized as follows:

1. The treatment of glands due to chronic inflammatory processes is simple, and consists in removing the cause.

2. Syphilitic tumors or ulcers are likewise most amenable to treatment under antiluetic measures, once the diagnosis is made.

3. Carcinoma of the neck, whether primary or secondary, naturally presents a more or less hopeless problem. The primary focus as well as the glands should be removed if possible. In far too many instances treatment is of no avail, although *x*-ray and radium therapy may prolong life.

4. Sarcoma, malignant lymphoma, or Hodgkin's disease. The outlook is about the same here as with carcinoma. In these cases a correct diagnosis is essential because, although an absolute cure is improbable, persistent radium or *x*-ray treatment under competent supervision may prolong life for years.

5. In leukemia radium and *x*-ray treatment may be of great help. In the majority of cases, however, treatment consists in making the patient as comfortable as possible.

6. The treatment of tuberculous cervical adenitis has undergone marked changes during the past five or ten years. Up to the year 1905, and in some places very much later than this, even up to the present time, the treatment of tuberculosis of the glands of the neck was looked on as one wholly and entirely belonging to the surgeon. A curious distinction was made, which Hawes has never been able to understand, between tuberculosis of the lungs, where it was the patient himself who was put under treatment and given the fresh air, rest, and proper food, on which the cure of tuberculosis is known to rest, and those cases where the tuberculosis was not in the lungs, but in the glands of the neck. Here the patient himself was apt to be entirely disregarded, while the surgeon devoted his attention to the lumps in the neck, and endeavored by surgical measures—sometimes well but far too often badly done—to remove the glands and to bring about what he hoped would be a cure. Such "cures" were generally very temporary ones. In the records of any large hospital will be seen reports of case after case operated on for "the radical removal of tuberculous glands of the neck" and discharged as "cured." If the subsequent history of many of these patients were followed, and at the Massachusetts General Hospital Hawes has had an opportunity of personally looking up many such histories, it would be found that a large proportion were not radically cured or cured in any sense of the word, but returned to the dispensary or out-patient department in a few months or years, or went to some other hospital, for further operation for the recurrence of the glands.

The routine procedure which Hawes endeavors to have carried out in every one

of these cases which comes to his clinic at the Massachusetts General Hospital, or to him in private practice, is somewhat as follows:

First, find and, if possible, remove all sources of infection. This means a careful examination of the teeth, by *x*-ray if necessary, to reveal any hidden collection of pus around the roots, examination of the tonsils and adenoids, if present, and their removal if necessary, as well as a careful search elsewhere for any infectious focus.

Second, operative measures.

In regard to surgical procedures, an operation may or may not be necessary, depending on:

1. The size of the glands involved, whether they are discrete and easy to be removed, or whether they consist of masses matted together and presenting a surgical problem of great difficulties.

2. Whether the general condition of the patient warrants an immediate operation, or whether, as is often the case, it is not better to remove the foci of infection and to build up the patient's general health before operation.

3. Whether the glands have broken down and begun to suppurate. If this is the case, an operation under local anesthesia, consisting of a simple small incision large enough to allow of free drainage, but with no attempt to do anything radical, should be done, and the sooner the better.

4. Whether the standard of surgical skill available for the individual patient is a sufficiently high one. In far too many cases an operation for the removal of glands of the neck is looked on as an easy and simple operation. Hawes's own experience makes him firmly convinced that it requires mature judgment, great technical skill, and long experience to do good surgery in such cases.

5. Finally, Hawes's decision as to whether he should call in a surgeon would depend on the finances and on the intelligence of the patient. If it were no hardship for the patient to undergo the longer period of treatment by general hygienic measures, tuberculin, etc., in the great majority of cases he should advise this. In justice to the surgeon whom he should select to do an operation, should one become necessary, as well as to the patient, the surgeon should see the case at the beginning and be kept in touch with the patient afterward. In many cases he has advised an immediate operation among workingmen and women when he knew it could be skilfully done, simply because it took less time and in the long run cost less money than slower and more conservative though perhaps safer methods.

Third, general hygienic measures. The question as to how much each patient needs in the way of improved hygiene, fresh air, rest, etc., must naturally depend almost entirely on the individual case. Many of his patients, particularly among the children, are apparently in the most splendid health, and it seems absurd to demand increased or better food or any radical changes in their methods of living. Heliotherapy, or sunlight treatment, where it is possible to carry it out successfully, Hawes believes to be of the greatest benefit in all cases. In Massachusetts, at least, the New England climate—especially in the wintertime—practically rules this out. Outdoor sleeping is of great help when it is not a hardship. Four or five glasses of milk in addition to three good meals a day is all he ever demands in the way of increased food. A cool sponge bath down to the waist every morning is beneficial. Sundays, Saturday afternoons, and holidays should be spent in the open—out of town if possible. Plenty of sleep with windows open, when outdoor sleeping is impossible, is essential.

Fourth, tuberculin. During the past ten years, at the Massachusetts General Hospital, Hawes has had under his care nearly 500 cases of tuberculous cervical adenitis, and has used tuberculin in practically all. He can, at least, say with absolute certainty that in no instance has tuberculin done any harm. In a few instances he has been unable to see that it has done much, if any, good; in a large number he is willing to go so far as to say that he believes tuberculin has been a factor in the resulting improvement, while in a small, carefully selected group of cases he can go still further and

say that he is certain tuberculin has been the principal factor in the patient's recovery. He does not wish to be considered a "tuberculin enthusiast." If he had to drop any one of the four factors in the treatment of these conditions—elimination of sources of infection, hygiene, surgery, and tuberculin—he would prefer to do without the tuberculin first and surgery second, though it would be a close decision between these two. Likewise, he does not believe that tuberculin should be used by the general practitioner or surgeon. It should be kept in the hands of those who, from long experience and careful study, know its dangers and limitations as well as its value.

REMISSIONS IN LEUKEMIA PRODUCED BY RADIUM IN CASES COMPLETELY RESISTANT TO X-RAY AND BENZOL TREATMENT.

In the *Boston Medical and Surgical Journal* of April 5, 1917, ORDWAY states that the methods of administering benzol in the treatment of leukemia have now become almost uniform. Capsules, in certain instances coated with salol, containing 0.5 gramme of benzol, are given with equal parts of olive oil to diminish the irritating local effect. Two of such capsules are given at first, increasing until ten—that is, five grammes a day—are administered. They should be taken immediately after meals and never during meals, and it is important that the patient should be kept in the hospital during such treatment. It may take ten days to three weeks before the effect upon the blood is observed. It is customary to stop administering when the white count in leukemia has been reduced to 20,000. Boardman states that sixteen out of one hundred cases failed to show improvement, and that another eight cases, although reacting favorably at first, died during or soon after the discontinuance of treatment. Also certain toxic effects have been reported, such as gastrointestinal disturbances, headaches, dizziness, skin eruptions, bronchial and kidney irritation, and hemorrhages. Marked leucopenia with increasing anemia and death may occur.

The technique for treating leukemia by the Roentgen ray has been very variable, and this may account to a certain extent for the variations in the results obtained. Boardman *(loc. cit.)* states that the *x*-ray has produced improvement in from 20 to 50 per cent of the patients—that is, 50 to 80 per cent of the cases are refractory. In most cases the long bones as well as the spleen have been radiated. In many instances, however, too little attention has been paid to the principles of cross-fire and filtration (deep therapy). The principle of the so-called "cross-fire" is important for the successful application of radium or *x*-rays to large growths or to deeply seated lesions. The method was first described by Domenici and has since been elaborated by others, notably in the treatment of uterine fibroids by *x*-rays in the Freiburg clinic by Kroenig and Gauss. The aim is to concentrate as much of the action of the rays as possible in the deep-seated lesions with the least possible injury to the overlying skin. This may, in certain instances, be accomplished by employing small tubes of radium scattered throughout a tumor mass or by surface applications of heavily screened radium or *x*-ray to a large number of areas on the skin so that each area will not be exposed too long or too intensively. This might be the result in applying the radium to a single area for the time necessary to produce the desired effect on the underlying lesion. By this cross-fire method enormous doses, even 1000 to 1500 Kiemboeck units, may be applied to the deep lesion when not more than 20x could be safely put through one particular surface area. Pfahler uses from 4 to 40 surface areas and passes a full dose through each, making a total of from 80 to 800 units.

To produce any marked effect upon the deeper tissues it is necessary to use screens or filters to check the less penetrating rays which would otherwise be absorbed by the superficial tissues and cause marked destructive changes there before the less numerous and more penetrating rays could act on the deeper tissues. In order to obtain the most penetrating *x*-rays for this

method of so-called "deep Roentgen therapy," the well-known "Tiefenroentgentherapie" of the Germans, it is necessary to employ a hard tube of high degree of vacuum and an electrical apparatus of high voltage. The rays are not all of equal penetrability, and it has been found that they are more homogeneous when the softer have been "filtered out" by an aluminum screen 3 millimeters in thickness. Certain roentgenologists also use a heavy piece of leather.

When radium is used for the treatment, screens or filters of lead 2 to 3 millimeters in thickness, of brass 1.2 millimeters, or other heavy metals such as silver, gold, or platinum, allow the penetrating hard beta and gamma rays to pass and intercept the alpha and soft beta rays which would otherwise be absorbed and cause destructive changes in the superficial tissues. As the amount of the more penetrating rays is only a small proportion of the total activity (less than 5 per cent), it is necessary in deep therapy to make exposures correspondingly long.

The principles of cross-fire as well as deep therapy are made use of in the treatment of leukemia by surface applications of radium. The technique of such radium therapy may be illustrated by the striking effect of radium when applied in the proper manner to the surface over the enlarged spleen in cases of myelogenous leukemia.

When from 50 to 60 milligrammes of radium element or millicuries of radium emanation are employed, evenly distributed over a surface applicator 2x2 cm. in diameter, and the filtration above mentioned is used, the radium may be left in each position from four to six hours—four hours if there are 60 milligrammes, six hours if there are 50 milligrammes and if the filtration is 3 millimeters of lead. With this amount of radium and the above technique it is possible for complete remission in leukemia to occur with three series of treatments. Amounts of radium, however, as small as 25 milligrammes, even when this is in the form of a tube, have reduced the spleen to normal size, and have caused the characteristic improvement in the blood and in the general condition of the patient, but the time required is longer and the series of applications more numerous.

It has been the practice of many roentgenologists to radiate the long bones as well as the spleen in cases of myelogenous leukemia. In the writer's experience, however, it has not been necessary or, indeed, seemed advisable, when radium is used as the therapeutic agent, to radiate the long bones. Surface applications of radium over the enlarged spleen in the manner above described produce most remarkable improvement, with striking changes in the size of the spleen, the blood picture, and the general condition of the patient. In the course of a few weeks, or in certain instances in three or four months, after radium treatment by surface application a spleen which filled almost the entire abdomen and extended well to the right of the median line and into the pelvis and caused marked pressure symptoms has been reduced to normal dimensions so that it was not palpable below the costal margin. The white cells in the blood were reduced from 500,000 to 6000, the immature forms being especially affected. The hemoglobin increased from 60 or less to 90 per cent. Red blood-corpuscles may increase from 2,000,000 to 5,000,000. The abnormal blood cells, myeloblasts, and myelocytes disappear. Indeed, the blood picture returns almost to normal, although some variation in the size of the red cells may persist and there may be relative lymphocytosis. A pale, emaciated, anxious individual with prominent bony framework, stooping shoulders, and enormously enlarged abdomen usually loses the anxious expression, becomes plump, the abdomen returns to normal size, and the color and strength improve so that the patient may feel entirely well. The pathological condition, however, sooner or later is apt to relapse, and response is less prompt in subsequent series of radium treatments. Some of the patients treated with radium have been followed for a number of years and kept in good condition by the occasional repeating of radium treatments. Certain

cases, however, similarly treated have died of intercurrent infection or have succumbed to the original disease.

Conclusions.—(1) Surface applications of radium in leukemia produce striking, indeed remarkable, improvement in (*a*) the blood picture, which becomes almost normal; (*b*) in the size of the spleen and glands, which are reduced almost to normal; (*c*) in the general condition of the patient, who from an emaciated and weak condition may become plump and strong. (2) The duration of remission is variable: it may last from months to years. (3) The results of radium treatment are not regarded as curative. It is believed to be, however, the safest as well as the most prompt palliative measure in cases of chronic leukemia whether refractory or not to benzol or *x*-ray treatment. From the results of radium therapy in leukemia it is believed to be the best form of treatment now at our disposal.

ECLAMPSIA AT THE BOSTON CITY HOSPITAL: A REVIEW OF THE CASES OF TWENTY-THREE YEARS.

In the *Boston Medical and Surgical Journal* of April 5, 1917, YOUNG gives us the results of operative and non-operative treatment on both mothers and children. In looking over the records, the writer often finds it difficult to differentiate between mothers dying of toxemia and those already weakened who perished from the shock of delivery. The number of convulsions, pulse-rate and blood-pressure are not by any means infallible guides as to how an eclamptic will bear operative delivery, and the writer, watching the results of the various methods, has changed his opinions somewhat regarding immediate delivery by heroic measures. Many apparently hopeless cases survive a long operative delivery; and some, in apparently the same condition, fail to recover after very simple procedures. Under all circumstances the shock of an operative delivery is considerable, although many of those so delivered would doubtless perish under any form of treatment. It is usually in the milder cases that more gentle and prolonged methods of delivery are apt to be employed, although they appear, from the experience of the writer, equally effective, if not more necessary, in many of the severe cases under discussion.

Owing to the serious condition of most of these patients, the milder rather than the more immediate and strenuous methods seem better suited for their delivery, and the latter should be used only when the former appear inadequate. Some patients may possibly be lost by delay, but more will be saved by the avoidance of shock.

In primiparæ (except in the very early months), both where labor has not begun and where there is partial dilatation and a rigid os, most serious cases may be delivered by the use of the dilating bags; while in multiparæ they are often still more effective. By this means we are imitating the processes of nature by which the best results in delivery appear to be attained.

Whether the irritation of the bag in the uterus tends to continue or to excite convulsions is a question upon which the writer is as yet undecided. Most excellent results have been obtained by their use in desperate cases, and there have been unfavorable results as well.

Although delivery is lengthened in some, there is much less shock, less liability to laceration of the cervix, and less chance of sepsis, even though manual dilatation is used to complete the task. A rigid os frequently softens, and manual dilatation, if necessary, is more readily accomplished. The fact should be pointed out that Voorhees bags alone were used in some cases too sick for operative delivery.

For the vaginal Cæsarian section as a means of immediate delivery, the writer sees no advantage in the clean cases advanced beyond six months, since the operation is difficult in primipara under any circumstances. In multiparæ it is also difficult, if the cervix is high in the pelvis. After the uterus is opened the labor must still be ended by forceps or version, and

the repair is long and tedious. There were but four cases in this series, three of which were operated *in extremis* and fatal; one dying on the table.

Abdominal Cæsarian section has been performed once. The writer believes it proper in certain cases in which immediate delivery appears necessary and other methods seem too prolonged, uncertain, and difficult, because of the size of the child or the condition of the cervix.

The relation of blood-pressure to prognosis and treatment is a matter of great interest in the severe types; but the available data are too small for absolute conclusions. Of 42 cases with data available, 12 died. Three died out of seven with a pressure of 200 or over; nine others died with pressures varying from 104 to 160; while 30 cases, varying from 210 to 106, and with an average systolic pressure of 157, all recovered.

The methods of delivery were so dissimilar that no comparison could be made to show the influence of any special method of delivery upon results.

High blood-pressure makes the outlook less hopeful, but does not necessarily mean a fatal outcome. Diminution of pressure after delivery is a hopeful sign.

The number of venesections is too small for reliable statistics, especially concerning a procedure where judgment as to worth depends so much on an intimate knowledge of the individual case. It has been tried in the cases with high pressure and usually in severe types after delivery.

There were 18 venesections, nine of whom recovered and nine died. Six of the nine mortalities were in cases received postpartum, and two of those which recovered were likewise admitted after labor. One patient died undelivered.

In antepartum venesection the writer has little faith, except in certain plethoric individuals, and believes it should be employed with the greatest care at this stage. It is not possible to foretell either the amount of blood which will be lost during birth or the reaction of a toxemic patient to the strain of delivery.

Venesection is often of great advantage in the strong, healthy, full-blooded, restless individual, in whom blood-pressure remains high or has a tendency to rise after delivery; but in those who are frail or fat and flabby its advantages are very doubtful. Loss of blood lowers the resistance to infection, to which all cases of toxemia of pregnancy are very susceptible.

During bleeding the blood-pressure should be carefully watched and not allowed to fall below normal; while to all cases of venesection fluid should be administered either by rectum or by hypodermoclysis where the first method is not available. Additional fluid is not required by patients with edema of the tissues.

The medical treatment has been along the usual lines—free catharsis, gastric lavage, control of convulsions by sedatives and ether, enteroclysis, hypodermoclysis, and hot packs in some cases. Sweating has not been used so often during the latter years. It has appeared to be of doubtful efficacy, and distinctly detrimental to some.

The fact that patients, too sick for safe operative delivery, sometimes recover under medical treatment is often forgotten in the desire to obtain immediate results. The Voorhees bag may be advantageously combined with medical treatment. There are a number of cases in the present series in which delay in obstetric surgery has been followed by recovery, when operative measures would have been fatal for the mother. Each case must be considered by itself and no general rule can be applied, except that the method adopted for delivery should be the gentlest and most efficacious for that individual.

From what has gone before it is clear that results with the class of cases received in their wards cannot be as good as one would wish, but are about what might be expected. On the whole the mortality seems to be lessening. Unfortunately this cannot be ascribed to treatment alone, as the severity of eclampsia varies in different years.

This series is published in the hope that it may aid in some larger collection of cases.

The conclusions reached have been deduced from a study of the cases and are not all capable of proof by statistics alone.

1. Incidence varies greatly in different years and without apparent cause.

2. Severe attacks occur mostly in primiparæ from twenty to twenty-five years, in the latter half of pregnancy.

3. A little over one-half the cases with convulsions have seizures after delivery.

4. Non-operative delivery is most favorable for the mother.

5. The longer the convulsions continue, the greater the mortality.

6. Child mortality is high whether deliveries are operative or non-operative, owing to prematurity and toxemia.

7. High blood-pressure increases the gravity of the prognosis.

8. Venesection is a useful procedure in cases with high pressure and restlessness after delivery.

9. Induction of labor and delivery with the least possible operative interference offer the best chance of recovery for the mother.

10. Cæsarian section is justified in certain cases in which delivery by other methods seems too prolonged or doubtful in outcome.

INFANT STOOLS AS DIAGNOSTIC AIDS TO THE GENERAL PRACTITIONER.

WESTON writing in the *Southern Medical Journal* for March, 1917, states that green is the most usual abnormal color seen, and is generally due to either excessive acidity or alkalinity changing the bilirubin to biliverdin, or to the bacillus pyocyaneus. A stool changing from yellow to green has no significance. A very dark-green stool is significant of disease. When the color is due to bacterial action the addition of nitric acid decolorizes it. If due to biliverdin, the addition of nitric acid produces a prismatic play of colors.

The next most common abnormal color is gray. When the stools are gray at birth, or become so shortly after birth, the cause is usually a congenital obliteration of the bile ducts, or an atresia or obstruction in the intestines. When associated with mucus the trouble is usually in the duodenum. The most usual cause for the gray color is fat in some form, probably soap, and the absence of bile. It must be remembered, however, that this color is not inconsistent with the presence of bile, since the bile may be present in the form of the colorless leucohydro-bilirubin. The presence of bile may be detected as follows: A small amount of feces is stirred up in water and a few Cc. of the resultant mixture treated with an equal amount of a saturated aqueous solution of bichloride of mercury. A green color denotes the presence of bile pigment.

Stools that are white are due to the presence of undigested fat in the form of soaps.

When the stools are black the color is due either to blood or to some drug, probably bismuth.

Sometimes a stool is seen that is grayish-blue in color and is of no particular significance, being due to some change in the bile pigments.

Occasionally around the edge of the stool is observed a pink stain. This often occasions some anxiety on the part of the mother. This is caused by some change in the bile pigment and is of no significance.

The odor of the stools of fat indigestion has a strong scent of butyric or lactic acid.

Protein indigestion produces an odor of putrefaction. Indigestion caused by carbohydrates gives the odor of lactic, acetic, or succinic acid.

When there is an excess of fat the reaction is acid, and when there is a relative excess of proteins the reaction is alkaline. When carbohydrates are in excess or when there is fermentation of the carbohydrates from bacterial activity the stools become acid. Frothy stools are the result of either carbohydrate fermentation or the result of decomposition of protein, and in either case are acid in reaction. Stools that irritate the buttocks are invariably acid in reaction.

The reaction of the stools is best tested by placing wet red or blue litmus paper on the fresh surface of the stool. When starch is added the color becomes more distinctly brown, the reaction usually acid, and the

stools have an aromatic odor. If the starch is derived from oats the stools may become loose, while if from barley the tendency is toward constipation. The specks so often seen in the stools of infants taking either oatmeal or barley starch are husks, and must not be confused with grains of sand, as is so often done.

When animal broth is added to the infant's food the stool is brown in color, the odor fecal, and the reaction alkaline. When an animal food is given as a meal to an infant, and the following meal is a milk mixture, it is not unusual for the stool to present two distinct colors, definitely separated.

The most usual abnormal constituents are curds. These may be composed principally of fats or of casein. The casein curds are usually much larger than the fat curds, are firm and tough, and cannot be broken up by pressure. They sink when placed in water, are insoluble in ether, and when placed in ether become as hard as a stone. The fat curds are usually small, varying in size from mere specks to a small pea. They may be either white, yellow, or green. They are soft and are easily broken up when pressure is applied. When placed in water they tend to remain in suspension. After acidification and heating they are soluble in ether, and are unaffected by formalin. Sometimes when the stool appears greasy, and a portion is pressed against paper and dried, if the appearance is due to fat the paper remains as if oiled.

When mucus is mixed with the stool its origin is usually the small intestine; when in combination with a gray-colored stool its origin is the duodenum; when on the outside of the stool, from the rectum. Stools composed of blood and mucus indicate either a disease of the colon or intussusception. Undigested starch may be mistaken for mucus. By the addition of iodine the starch may be distinguished from mucus, as iodine when in contact with starch stains blue and does not affect mucus.

Blood on the outside of a firm stool indicates a fissure of the anus. Hemorrhage from the bowel in the first few days of life is usually a symptom of hemorrhagic disease of the new-born; when appearing later, of intestinal polyp.

Pus is seen usually toward the end of an attack of a severe inflammation of the large intestine.

The macroscopic examination of the stools is usually sufficient in the great majority of cases. The microscopic examination is necessary in order to detect ova of intestinal parasites and the amount of undigested starch and fat. For the purpose of examining for intestinal parasites it is only necessary to dilute the stool with a few drops of water and spread it out on a slide. For examination for starch, a small portion of the stool is stained with Lugol's solution. The starch granules stain violet or blue. For fat, stain a portion of the stool with a saturated alcoholic solution of Sudan III. The neutral fat drops and fatty acid crystals stain red. Soap crystals do not stain with Sudan III. After getting the above picture thoroughly fixed in mind, a drop of glacial acetic acid is allowed to run under the cover-glass, and placed over a flame until it merely simmers. This procedure converts the soap into neutral fats and fatty acids which appear as large red-stained drops. These crystallize upon cooling. Any increase in the amount of fat after the above procedure indicates the presence of a corresponding amount of soaps.

For the detection of the gas bacillus, which is of the utmost importance in determining the course of treatment in infectious diarrhea, the following procedure is recommended by Morse as simple and easily done: A small portion of the stool is added to a test tube of milk. The infected tube is then placed in a water-bath and allowed to boil for three minutes. The tube is then placed in an incubator at body temperature and kept there for from 18 to 24 hours. The object in keeping the tube in the boiling water-bath for three minutes is to destroy the spore-bearing organisms. When the gas bacillus is present the casein is largely dissolved; the residual casein is somewhat pinkish in color and filled with small holes; and the odor is much like that

of rancid butter, as the result of the formation of butyric acid by the gas bacillus. Gram-stained preparations made from milk show rather thick, short Gram-positive bacilli, with slightly rounded ends.

MODERN ASPECTS OF HEART DISEASE.

SUTHERLAND in the *Lancet* of March 31, 1917, states that the term "cardiac tonic" is still in common use and is employed somewhat indefinitely. It is applied to drugs which are supposed to stimulate or increase the contractile power of the heart. Some cardiac tonics are supposed to act directly on the musculature and others through the nerves of the heart. If one takes a list of the so-called cardiac tonics and tries to ascertain the exact action of the individual drugs it will be difficult to state precisely what special result is to be looked for. Digitalis and its allies, strophanthus and squills, stand apart from the others in this respect.

Balfour (1897) held that the fundamental action of the digitalis group was to increase the elasticity of the muscular fiber of the heart, so that it expanded more slowly and contracted more perfectly. Broadbent (1897) considered that digitalis caused a more complete expulsion of their contents by the energetic contraction of the ventricles, and also improved the suction action during diastole, thus withdrawing the blood which had been dammed back in the veins. Brunton found that digitalis acted on the cardiac muscle, on the intrinsic cardiac nerves, on the vagus center in the medulla, and also on the arterioles. Sutherland does not find any clinical proof of the accuracy of these views. There was no precise knowledge of the underlying changes in cardiac failure which digitalis is specially fitted to remedy. Each authority seems to draw his conclusions from few and imperfect observations, or even to make his observations for the purpose of supporting his previously formed conclusions. In many cases what would now be regarded as the outstanding changes in cardiac failure were relegated to an entirely subsidiary position.

It is interesting to note that twenty years ago the special symptoms which called for digitalis had been recognized. These may be summed up as cyanosis and dropsy, with a rapid, irregular pulse and breathlessness. This condition is most frequently due to auricular fibrillation, and is still the one in which the action of digitalis is most clearly demonstrated. Digitalis was used as a cardiac tonic, and having been found beneficial in this special type of case it came to be used indiscriminately in all forms of severe illness with cardiac weakness. When Sutherland was house physician it would have been regarded as almost criminal to let a patient die without giving digitalis, whether the disease was pneumonia, typhoid fever, or pernicious anemia. He believed that digitalis was the great cardiac tonic and always suitable if cardiac failure threatened. Other cardiac tonics and stimulants have had their day, and are still used by those who believe they have seen good results follow from their use. Amongst them may be mentioned strychnine, caffeine, camphor, adrenalin, and pituitrin. The exact mode of their action on the heart, if any, has not been determined, and the type of case suitable for their application has not been clearly differentiated. Digitalis, however, holds its own in the present as in the past.

Progress has been made, and although differences of opinion may still exist we are a good deal nearer the answers to the questions why to use digitalis, when to use it, and how to use it. The progress of scientific medicine is often delayed by the existence of unscientific beliefs, and the employment of digitalis in heart disease is an illustration. The one outstanding fact about the action of digitalis which has been fully established is that it slows the action of the heart under certain conditions. Sutherland proposes to consider how this slowing is brought about; what effects follow from the slowing; and whether the ascertained beneficial effects from digitalis are not to be explained solely as the result of this cardiac slowing. In doing so no attempt is made to dispute the various

effects on the cardiac muscle obtained by physiologists and pharmacologists in their experimental work with large doses of digitalis. The pharmacologist cannot produce in animals those changes in the tissues and functions of the heart which are the result of disease, nor can he form any estimate as to what the results of digitalis in therapeutic doses will be in the treatment of cardiac disease.

In ordinary language slowing of the heart means slowing of the rate of contraction of the left ventricle, and this is estimated clinically by the pulse-rate or, if necessary, by auscultation of the heart. An increase in the ventricular rate or a serious disturbance of the cardiac rhythm is never primarily ventricular in origin. The ventricle follows but does not lead the cardiac rate or rhythm, which is always initiated in some part of the supraventricular tissues. In diseased conditions an increase of rate or a disturbance of rhythm is also started in the supraventricular tissues. Consequently it would appear that treatment should be directed to the supraventricular tissues from which the disturbance proceeds.

Here are two further points to be considered: First, it has not been shown that digitalis in medicinal doses—and we are dealing solely with digitalis as a therapeutic agent—has any direct effect on the wall of the left ventricle. Consequently we must not assume that digitalis acts on the ventricular muscle. Secondly, it has been shown that the slowing action of digitalis is through the vagus nerve, but it has not been shown that the vagus has any direct action on the musculature of the left ventricle. Assuming them to be true, we draw this conclusion—that digitalis slows the rate of the left ventricle without acting on the ventricle; and that it produces its effect through the vagus nerve, which also has no direct action on the left ventricle. It therefore follows that as the rate of the left ventricle is dependent on impulses proceeding from other parts (the supraventricular tissues), the action of digitalis through the vagus must be on these supraventricular tissues. In an attempt to slow the ventricular rate through the supraventricular tissues, there are two possible lines of action: (1) to check the rate of impulse discharge at some overacting center, or (2) to block some of the rapid contractile impulses in the conducting tissues so that a diminished number of them reach the ventricle. Clinically it can be shown that in slowing the heart-rate this is the mode of action of digitalis.

SYDENHAM'S CHOREA WITH SPECIAL REFERENCE TO TREATMENT.

In the *Ohio State Medical Journal* of April 1, 1917, DANIEL and LAMBRIGHT state that from their experience they are led to believe that the tonsils very frequently contain the source of trouble in chorea.

The greatest care as to oral hygiene should be exercised. Decayed teeth should be taken care of properly, and if there are any alveolar abscesses they should be drained.

Discharging ears are sometimes the source of trouble and should be carefully treated. In some of these cases autogenous vaccines are of service.

Sometimes it is the intestinal canal that is letting the toxins and bacteria into the system and calls for treatment. Here daily irrigations should be employed. The use of lactic acid cultures has been of value.

There is an undoubted relationship between acute rheumatism and chorea. The question naturally arises regarding the application of antirheumatic remedies in this disease. It is not difficult to understand why the results have been discouraging when we consider that the toxins and cocci are in the cerebrospinal fluid and brain tissues and realize the small amount of salicylates excreted into the cerebrospinal fluid. The combination of the alkalies with the salicylates appeals to one as rational and has been shown to be of great advantage. There is a probability that they act by neutralizing the acid toxins of the bacteria.

Arsenic has been looked upon as a specific. The introduction of salvarsan into

therapy brings up the question of the application of the remedy in this disease. Arsenic was used empirically as a general nerve tonic as long ago as 1780 by Alexander. Pawlow, von Bakay and Pierre Marie have used salvarsan and report favorable results. We are certainly able to get enormous doses of arsenic into the system by the use of this drug. On this account where arsenic is indicated, especially in intractable cases, its use is feasible. Milian argues that there is a luetic factor in a great many of these cases, and on this account the therapeutic results in some of them may be explained.

The symptomatic treatment is a very important part. The patient should be placed at rest with isolation from influences which tend to excite. Schoolchildren who develop chorea should be immediately withdrawn from school and about the streets. It is well not to allow a child to read or to exert its mind. Careful diet should be instituted and the bowels regulated. Toxic foci if located should of course be removed before this treatment is instituted. For the motor restlessness hydrotherapy offers the best results. Occasionally chloral, bromides, hyoscyamus, or small doses of morphine are demanded in the severe cases.

Recently Mayer has reported a series of cases in which he injected a small amount of one-per-cent phenol solution intravenously. The results according to his report have been good. This is a new treatment and it is too early to judge of its efficacy.

We must always keep in mind that in a large majority of cases there is a myocardial involvement. The great damage that may be done by overexertion is well known.

Suffice it to say that prolonged rest with ice-bag to chest should be insisted upon. Whenever there are signs of cardiac decompensation the routine treatment for that condition should be carried out.

Poynton and Payne recently issued instructions which should be given to parents of rheumatic children which might well be applied to cover chorea. The instructions are as follows:

1. The importance of proper clothing.
2. The care of sore throats.
3. The necessity of attention to growing pains.
4. That nervousness, clumsiness, and night terrors are often warnings of chorea.
5. That patients should be warned that signs of heart disease are few, and that shortness of breath is by far more common than pain.
6. Much emphasis should be laid on the need for patience when the child is recovering from this disease.
7. Parents should be told that rheumatism and chorea are liable to recur..

THE PRINCIPLES OF THE TRANSFUSION OF BLOOD.

STANSFELD in the *Lancet* of March 31, 1917, reaches these conclusions:

1. Transfusion has been successfully employed in the treatment of various kinds of anemia and in the arrest of spontaneous hemorrhage. It has also yielded promising results in cases of serious infection and in certain toxemias.

2. The ultimate prognosis in cases of anemia depends upon the power of reaction in the bone-marrow, and this can only be adequately determined by observing the results of treatment.

3. In cases of pernicious anemia both increased red-cell production and diminished red-cell destruction may result from transfusion.

4. In cases of pernicious anemia the age of the patient, the duration of the disease, and the condition of the bone-marrow as indicated in the peripheral blood have hitherto proved to be the best guides to the progress subsequent to transfusion.

5. The optimum dosage for transfusion is not yet determined, but it is probable that moderate repeated doses are preferable to large single doses in the treatment of chronic anemia. Very small doses may sometimes be of value.

6. The donor should be a healthy adult with negative Wassermann reaction. The serum of the donor should not agglutinate the corpuscles of the patient, and the serum of the patient should not agglutinate the

corpuscles of the donor. Agglutinins should be excluded by tests done immediately before the transfusion, and a single examination is not sufficient to establish the compatibility of two bloods on all future occasions. If agglutinins are absent, hemolysins will also be absent.

7. If there be great urgency and testing of the blood of patients and donor be impracticable, a small preliminary transfusion should be done half an hour before the main mass of blood is transfused, so that gross incompatibility may be recognized in time.

8. Febrile reactions occur after about 25 per cent of transfusions, even though the bloods of donor and patient have been proved to be "compatible." Rigors occur in about 10 per cent of the cases.

9. It may prove desirable to investigate the blood of donor and patient with regard to factors of which we as yet know nothing, not merely for the sake of avoiding accidents, but also to determine whether a given donor is likely to afford the maximum of benefit in a particular case.

10. The indirect method of transfusion, employing a glass receiver and sufficient sodium citrate to prevent coagulation of the transfused blood, is simple and involves no special dangers.

MERCURIALIZED SERUM AND BICHLORIDE OF MERCURY.

In the *New York Medical Journal* of January 27, 1917, PITTENGER reaches these conclusions:

1. Mercurialized serum, whether injected intramuscularly, intravenously, or intraspinally, is equally as toxic as corresponding amounts of plain bichloride of mercury.

2. The addition of an excess of serum to bichloride of mercury does not reduce its toxic properties, but merely deprives it of the property of destroying tissue by precipitating and then dissolving the albumin of the tissue, without changing its toxicity or therapeutic efficacy.

3. Intramuscular or subcutaneous injections of mercurialized serum are practically painless and are not followed by sensitiveness, pain, and sloughing, which usually accompany injections of the plain bichloride.

4. Intravenous injections of mercurialized serum are not followed by pain or sensitiveness at the site of injection.

5. Overdoses of mercurialized serum when administered intravenously produce the same untoward effects, such as blood in the stools, vomiting, retching, markedly increased and troubled respiration, etc., as plain bichloride of mercury, and care should be used, therefore, not to produce toxic effects by overdoses or administration at too frequent intervals.

6. Mercurialized serum in proper doses may be safely injected directly into the spinal canal.

7. In systemic syphilis very favorable results can be obtained by the intramuscular or subcutaneous injection of mercurialized serum.

8. Intramuscular or subcutaneous admininstration of mercurialized serum is to be preferred in the treatment of systemic syphilis, except in patients in whom quick results are imperative, in which case the serum may be administered intravenously.

PARAFFIN TREATMENT OF BURNS.

The *British Medical Journal* of April 28, 1917, recalls the fact that the paraffin treatment of burns was introduced by Dr. Barthe de Sandfort (*British Medical Journal*, July 29, 1916, p. 153), who used a proprietary article to which the name "ambrine" was given. This is, we understand, used in the navy; but judging from the paper by Lieutenant-Colonel A. J. Hull, F.R.C.S., R.S.M.C., the formula he recommends gives as good results. It is as follows:

Betanaphthol	0.25	per cent.
Eucalyptus	2.0	" "
Olive oil	5.0	" "
Hard paraffin	25.0	" "
Soft paraffin	67.75	" "

Colonel Hull recommended that it should be applied with a broad camel-hair brush sterilized in wax. Dr. Barthe de Sandfort prefers to put ambrine on with a spray, and this practice is followed in the navy for the

first coat at least. In using a spray the paraffin must be at a temperature of about 50° C. (122° F.). We are indebted to the Director-General R. N. for particulars of the spray used. The barrel is made of solid drawn brass tube 2 inches in diameter and 4 inches long. A brass stiffening ring is fixed inside the barrel to form a seating for the cover. The cover is fixed so as to be readily made air-tight, either by a bayonet

catch, as shown in the illustration, or by a course screw. The height over all is 4½ inches. A wooden handle is fixed 3 inches from the bottom. The nozzle is made to screw off for easy cleaning. A capillary tube leads from the nozzle to the bottom of the barrel; it is well curved, and allows a cleaning wire to be easily passed through. The necessary air pressure is obtained by an india-rubber spray bellows of suitable size.

THE THERAPEUTIC USE OF THE EXTRACT OF CORPUS LUTEUM.

In the *Medical Record* of May 19, 1917, HAPPEL states that in a case of headache following the menopause, due to insufficient internal secretion of the ovary, the extract of corpus luteum is a specific.

Extract of corpus luteum must be given over a long period of time and in sufficient dosage, according to the needs of the patient. It produces no toxic effect, except a feeling of fulness of the head or vertigo, and is not cumulative.

It is the best remedy for the relief of the nervous symptoms of the natural menopause, and for their prevention and relief in postoperative menopause.

It is of the greatest value in the treatment of irregular or scanty menstruation in young women and alleviates the neurasthenic symptoms so often associated.

It relieves dysmenorrhea in young girls and nulliparæ not due to a pathological lesion.

Benefit in nausea and vomiting of pregnancy has been reported.

The only disadvantage is the cost, which precludes its use in many cases in which it is strongly indicated.

THE TREATMENT OF CARRIERS OF ENDAMŒBA HISTOLYTICA WITH OIL OF CHENOPODIUM.

In the *Journal of the American Medical Association* of May 19, 1917, WALKER and EMRICH give their results when forced by circumstances to use an oil of chenopodium which had been kept exposed to tropical light and temperature for over a year, and had undoubtedly lost some of its potency. The treatment found most effective by them consists of (1) magnesium sulphate, from ½ to 1 ounce, at 6 A.M.; (2) oil of chenopodium 16 minims in gelatin capsules at 8 A.M., 10 A.M., and 12 M.; and (3) castor oil 1 ounce containing chloroform, 50 minims, at 2 P.M. This dosage is for adults; for children it should be reduced according to age. The administration of oil of chenopodium in gelatin capsules obviates all the disagreeable odor and taste of the oil.

There are, however, several essential factors in the treatment which need careful consideration. One of these is the preliminary purgation with magnesium sulphate, which is a very important part of the treatment. The purpose of this is twofold: first, to remove the excess of fecal matter from the intestine which envelops and protects the endamebas and dilutes the chenopodium; and second, and most important, to bring the endamebas out of their protective cysts and subject them in the vegetative condition to the action of the chenopodium. Walker's and Emrich's experiments have shown that this preliminary purging should not merely consist of the routine administration of the salts, but should also secure

free fluid bowel movements before the chenopodium is given, to be a most essential factor for successful treatment. Indeed, the success or failure of any method of treating endameba carriers with encysted endamebas in the intestine may depend on this preliminary purgation to get the endamebas in the unprotective vegetative stage. Secondly, the chenopodium must be administered while the stools are fluid—that is, at a short interval (two hours) after the purgative—in order that it may reach the endamebas while they are still in the vegetative stage. Finally, the stools of the patient must be examined repeatedly after the treatment by one capable of identifying Endamœba histolytica in the resting and encysted as well as the motile stages.

These preliminary experiments indicate that for the treatment of carriers of Endamœba histolytica oil of chenopodium is worthy of further investigation. They should be confirmed by further experiments in which fresh oil of chenopodium is used and with careful attention to technique, with especial reference to the preliminary purgation, and to more extended stool examinations after treatment to insure permanence of the cures.

INTRAVENOUS INJECTION OF SODIUM BICARBONATE IN DELAYED CHLOROFORM POISONING.

In the *British Medical Journal* of April 28, 1917, FARQUHAR tells us that he removed a gangrenous appendix from a soldier who had been gassed. The anesthetist began with ether, as chloroform is avoided at the Darlington Hospital in acute appendicitis, and also in cases in which there has been starvation or vomiting for some days before operation. It was soon found, however, that ether was dangerous in this case, causing extreme cyanosis and profuse bronchial secretion, owing probably to the bronchitis that still remained from the "gassing," and it was decided to continue with chloroform, which the patient took well.

Next day the temperature had fallen, the pulse was good, there had been little or no vomiting, the abdominal condition was quite satisfactory, and the patient seemed much better and was reading the newspaper on Farquhar's arrival. He had been getting sodium bicarbonate by the mouth and was taking fluids well.

Two days after the operation the house-surgeon reported that the patient was very sleepy, and was beginning to get jaundiced. Calomel and enemata were given, but the drowsiness increased. On the third day he was very yellow and in a state of coma, from which he could not be roused; it was accompanied by restless movements of the head and body when attempts were made to examine the pupils or to pass the catheter. Urine and feces were passed involuntarily, and no specimen was procured to be tested for acetone and diacetic acid. To all the surgeons who saw him the diagnosis seemed obvious—secondary chloroform poisoning—and the outlook hopeless. His relatives had come from another town to see him, but he could not be roused. Hoping for a temporary rally, Farquhar decided to inject intravenously a solution of sodium bicarbonate, as recommended by Langdon Brown in diabetic coma.

The incision was unnoticed by the patient, and two pints of sterile water containing five drachms in all of sodium bicarbonate were injected into the median basilic vein. Before leaving the table the patient drawled out the words "Oh, I say," again and again, but still could not be roused, and continued to pass urine and feces unconsciously until the next day, when a slight return to consciousness was noticed, and he tried to answer questions, but at first with no sign of understanding them. A pint of sodium bicarbonate solution was given subcutaneously every six hours and also occasionally by the rectum.

Two days after the intravenous injection the return to consciousness became more marked and he began to talk a little, but seemed childish. On the third day the mental condition was practically normal. The appendix wound healed by first intention, but convalescence was delayed somewhat by an abscess in the pectoral region

caused by the repeated subcutaneous injections, when the patient was restless, making it difficult to avoid sepsis. Otherwise recovery was uneventful and complete.

The interest of the case lies in the fact that recovery took place even after the onset of coma with involuntary passage of urine and feces. In most cases of delayed chloroform poisoning (of which Farquhar has, unfortunately, seen several) the pulse is rapid and weak, the patient is breathless before the onset of coma, and death is almost certain when this stage is reached. Whether intravenous injection of sodium bicarbonate solution can avert a fatal ending in any of these is doubtful, as in the case recorded above the pulse was never weak and running, but the treatment is, at any rate, worth a trial.

THE MODERN DIAGNOSIS AND TREATMENT OF SYPHILIS.

In the *New York Medical Journal* of May 12, 1917, THOMAS and BARNETT lay down the following conclusions or rules:

1. The treatment of syphilis, notwithstanding the promise of salvarsan and its substitutes, judged from the excellent serological results, extending in many instances over several years, remains in a sense empirical.

2. The ultimate proof of cure does not rest necessarily upon the continuous negative Wassermann reactions for one, two, three, five, ten, twenty, or even forty years, but rather upon complete freedom from symptoms for a generation or more.

3. The Wassermann reaction furnishes the best control of treatment and is the most reliable index of cure subsequent to proper treatment.

4. The sheet-anchor in the treatment of syphilis is no longer mercury, but salvarsan, neosalvarsan, or one of their substitutes. It is of paramount importance, however, that the injections of arsenobenzol in the beginning be administered as early as possible and intensively in full doses commensurate with the physiological tolerance of the patient, not scattered indefinitely over months, interspersed here and there with a Wassermann test. In view of the possibility of immediate cure by this drug properly administered in the primary if not the secondary and latent stages of the disease, the treatment of syphilis, particularly in the chancre period, prior to the advent of a positive Wassermann, becomes an emergency operation, in many instances no less imperative than the administration of antitoxin in diphtheria. Their experience dictates, as a reliable routine, two injections of salvarsan in the early chancre stage; at least three injections in the late primary and throughout the secondary or latent stage of the disease; and during the tertiary and hereditary forms of syphilis not fewer than four to six injections, supplemented by mercury and the iodides. If, after such treatment, the Wassermann still appears positive, a second series of injections should be administered.

5. Serologically judged on a three-month to a five-year duration, syphilis, in the chancre stage, if diagnosed early, either clinically or if necessary by either the dark-field microscope or the Wassermann reaction, may be cured by two injections of salvarsan or neosalvarsan; indeed, if the diagnosis is made, particularly before the advent of a positive Wassermann, one dose of either of these drugs may be sufficient.

6. Secondary syphilis seems to do just as well without as with mercury, provided enough salvarsan or neosalvarsan is given to produce a negative Wassermann.

7. The serological results in tertiary syphilis treated intensively with salvarsan and its substitutes are not so brilliant as those of the secondary period.

8. The French preparation of arsenobenzol and the Canadian diarsenol are excellent products and may be just as efficient as salvarsan and neosalvarsan, but on account of their greater tendency to toxic phenomena are not destined to supersede the original German products. Likewise arsenobenzol, owing to its lesser potency in the reduction of the Wassermann reaction, must be regarded as inferior to the German products.

9. The arylarsonate "soamin" and sodium cacodylate, both clinically and serologically, have no place in the effective treatment of syphilis.

10. Sociologically, in view of the fact that less than twelve per cent of our hospital syphilitics return for treatment until discharged cured, a problem is present which urgently demands the coöperation of our civil authorities and health boards for the necessary control and treatment of this disease, not, however, to be realized until all hospitals receiving State aid are compelled to maintain evening dispensaries with paid attendants for the proper treatment and admission, when necessary, of venereal patients.

THE REPLACEMENT OF MORPHINE IN SURGICAL PRACTICE, WITH A REPORT OF 110 CASES.

In the *Long Island Medical Journal* for May, 1917, SCHALL gives these results from clinical tests on pantopon:

He replaced morphine medication in the surgical wards by using pantopon.

The sedative effect of pantopon was very noticeably greater than that of its morphine equivalent. Respiratory and cardiac depression were far less marked than when morphine was used.

Postoperative nausea or vomiting and constipation were very much reduced through the new method of procedure.

Intestinal stasis or paralysis and anuria were not observed in a single case. Patients suffered no inconvenience when administration of pantopon was discontinued.

THE TREATMENT OF ASTHMA.

GEYSER in *American Medicine* for April, 1917, gives this advice as to the treatment of asthma:

With a faradic current examine the spine. Certain areas will be found that are hypersensitive to the current. A red spot usually appears in such areas. Apply one pole of the faradic current over the red or hypersensitive spot or spots, the other a large pad electrode over the entire lung area anteriorly. The interruptions at the vibrator point must be at least 5000 or more per second. After applying this current for 15 to 20 minutes the spasm will be relieved and stay so for a number of days. By repeating this treatment daily or even on alternate days for two weeks, the patient will be free for months.

THE VALUE OF FEEDING DURING OPERATION AS A PREVENTIVE OF SURGICAL SHOCK.

BROWN in the *British Medical Journal* of April 21, 1917, says that whatever theory of the causation of shock is accepted, it is quite certain that loss of blood and insufficient feeding are of great importance as predisposing agents. Operations on the stomach, such as gastroenterostomy and partial gastrectomy, are often accompanied by severe, and sometimes fatal, shock.

The operation is usually performed either for stricture of the pylorus and consequent gastric dilatation resulting from cicatrization of an ulcer in the pyloric region, or for malignant disease; in another class of case it is performed for severe hemorrhage from a gastric or duodenal ulcer. In the first class the patient's nutrition is low. Owing to the difficulty in the passage of food through the pylorus and the vomiting of a large part of the food ingested, a condition of starvation is induced, and when malignant disease is present, hemorrhages and cachexia add to the debility. In the second class the patient is usually profoundly anemic, and may have undergone a preliminary course of starvation only very partially alleviated by rectal feeding. It is not surprising that in such cases operations on the stomach produce an extreme degree of shock.

To combat this, it has been Brown's practice during the past ten years to feed the patient during the operation. The operation is proceeded with in the usual way until the suturing with catgut of the mucous membrane and muscular wall of the stomach

and jejunum is nearly completed—that is, to within the last one-fourth of it. A soft catheter with rubber tube and funnel attached is then introduced into the jejunum and passed on until the end of the catheter is in a coil of intestine well within the abdomen, the opening through which it is passed being held firmly with the finger and thumb to prevent any leakage of fluid. The intestinal and stomach clamps have been removed. A pint of peptonized milk, to which a beaten-up egg and an ounce of brandy have been added, is poured slowly through the funnel into the intestine; the funnel is held at a distance of 8 to 10 inches above the abdomen so that no undue distention of the intestine can take place. The catheter is then withdrawn and the operation completed in the usual manner.

Since adopting this procedure Brown has never seen serious shock follow an operation of this character, and the patient usually leaves the table with a better pulse than he had at the commencement of the operation.

A few weeks ago he operated upon a man of fifty-seven who was wasted and anemic. He had malignant disease involving the circumference of the stomach about five inches from the pylorus. Brown removed about two-thirds of the stomach, uniting the cardiac end to the jejunum. The operation was long, lasting for two hours, or a little more.

The blood-pressure, which was 140 mm. before the operation, fell to 90 mm. soon after its commencement, and was below 90 mm. when feeding was commenced. It had risen to 120 mm. half an hour later, when the operation was completed. He had no symptoms of shock afterward, and made an uninterrupted recovery.

Shortly afterward Brown operated upon a similar case, in which the carcinoma involved a still larger area of the stomach, and the resection was very extensive. The patient suffered somewhat severely from shock at the time of operation, but was sitting up in bed taking food well in the course of a few days. After an operation Brown generally starts regular feeding within twelve hours, giving two ounces of peptonized milk hourly to commence with.

In performing gastrostomy for stricture of the esophagus of the cardiac end of the stomach upon a patient who is in a cachectic and semistarved condition, Brown always feeds during the operation, passing a catheter through the gastrostomy opening into the duodenum, and injects a pint of prepared food and continues feeding regularly at four-hourly intervals after the operation.

In addition to its value in preventing the development of shock, this procedure tends to promote the healing of the stomach and abdominal wounds. It is obvious that tissue cells cannot divide and repair take place unless the cells are provided with food, and speedy union is of great importance in the success of these operations.

DEATH DUE TO STATUS LYMPHATICUS FOLLOWING AN INJECTION OF DIPHTHERIA ANTITOXIN.

In the *California State Medical Journal* for May, 1917, HASSLER reports a case of this character. Because of its importance and rarity the autopsy results are of interest. The enlargement of the lymph glands throughout the body was general, together with a persistent and markedly enlarged thymus gland.

The cause of the sudden death is attributed to the condition of status lymphaticus in this boy, one among thousands, and who could not stand antitoxin.

It is interesting to note that on the day previous the sister of this boy, who was the active case, had received intravenously 20,000 units of the same antitoxin, and on the following day in the same manner an additional dose of 10,000 units, and made a complete recovery.

This unfortunate case has not deterred the department's use of antitoxin, either as a curative or prophylactic measure, but it has brought its lesson, which may be of value to other health departments, not in the prevention of death in such cases, but the avoidance of criticism.

The Board of Health now requires:

First, the written consent of parent or guardian to administer antitoxin.

Second, the Sanitary Inspector must remain with the patient, or the contact, not less than one hour after its administration.

LIQUOR OF MAGNESIUM HYPOCHLORITE.

STEWART (*New York Medical Journal,* April 7, 1917) states that this solution may be made extemporaneously by adding a heaping teaspoonful of good calx chlorinata to a half-tumblerful of vinegar, and by adding two heaping teaspoonfuls of Epsom salts to a half-tumblerful of water. The two solutions should stand for fifteen minutes, then should be mixed, shaken, and filtered through gauze. A six-per-cent acetic acid will answer quite as well as vinegar; the different strengths of the domestic variety of the latter seem to be stumbling-blocks to exact scientific minds. It need not be so, as the vinegar is merely a solvent or a means of getting the almost insoluble chlorinated lime into a solution, therefore whether its acetic acid strength be four per cent or ten per cent is a matter of no moment. An eighty-per-cent acid is the best to use when bulk and portability are in question. The terminal result should be not less than two per cent nor more than six per cent after the solutions are mixed; anything more accurate is a refinement not obtainable in an emergency nor essential for any practical reason.

Stewart states that the relief of pain which follows the use of the solution is as incomprehensible as is the improvement of anemia through the administration of Blaud's pills. A long contact with any aqueous solution produces waterlogging on maceration. A similar contact with an alcoholic tincture results in hardening or a species of tanning; but this solution, called Mayer's solution, used in connection with a solution of sublamine in liquid paraffin Stewart has found to give almost ideal results.

The latter solution is made by adding sublamine to liquid paraffin, in the proportion of 1:3000, or a saturated solution, which is about 1:500, may be employed. The method advocated is for the medical attendant to cleanse the wound thoroughly with the acid magnesium solution. A gauze dressing is applied, and the patient is directed to moisten this with the oily solution every two hours while he is awake, using fifteen to twenty minims each time and applying it by means of a medicine dropper. The dressing is to be changed but once in four to eight days. There is entire freedom from adherent dressings and from torn-off scabs.

The liquor magnesii chlorinatæ may also be used as a constant drip, and as a means of sterilizing the vagina. It is said that the vagina remains sterile for an hour and a half after the solution has been applied, best by simply pouring it into the introitus held open without the introduction of fingers or instruments.

We have not had the opportunity of observing the action of these solutions personally. Should the experience of others confirm Stewart's findings the solutions are of extreme value.

A SANE AND RATIONAL METHOD IN THE TREATMENT OF ACUTE GONORRHEA.

Under this alluring title MILLSTONE (*New York Medical Journal,* March 10, 1917) expresses himself as having been astounded by the results following a treatment which consisted in injecting 2 drachms of a 50-per-cent solution of peroxide of hydrogen by means of what the author calls a soft-rubber ear and ulcer dropper, this being retained for five minutes. The action of the peroxide was to balloon out the channel and open up the crypts and lacunæ of the anterior urethra. After this pleasing distention the patient was directed to pass the remainder of the urine, the first part having been passed before the injection. Thereafter two drachms of a very warm solution of boric acid were introduced, retained for five minutes, and ex-

pelled. The shaft of the penis was next milked to expel as much of the boric acid solution as possible. Thereafter two drachms of the yellow oxide of mercury ointment were introduced slowly in such wise as to get the ointment into all the crypts and lacunæ. Thereafter the penis was allowed to hang dependent in a clean gonorrheal bag. The patient was then sent away and directed to take one teaspoonful of sodium bicarbonate three times a day. For the purpose of preventing erection a neatly fitting ring was slipped over the flaccid penis, causing such anguish on erection that the latter is inhibited. The author speaks in moving terms of the comfort afforded the patient by wearing this ring.

The injection treatment is repeated once daily for ten days. In three days the acute symptoms disappear, and in five days all discharges vanish. Fifteen days represents the longest treatment employed, nor could he find even a single gonococcus on what he called an "ejaculated specimen."

The special advantages claimed by the author for his method are that it prevents pushing the pus into the posterior urethra; that it is inexpensive, simple, clean; prevents the doctor's prescription from getting around the neighborhood; settles the question of stricture; and is soothing and non-irritating. He states, and who should know better, that it is the most scientific and logical method in the treatment of acute gonorrhea, and more nearly approaches a specific than any other. It probably requires an enthusiastic belief in its efficacy to produce its full therapeutic effect.

In contradistinction to these views there follows an article in this journal by GREENBERG, who holds that the object of treatment in acute gonorrheal infection must be directed not toward the suppression of the discharge, but toward its promotion, best accomplished by omitting treatment at the beginning of the disease. He resents, however, the pusillanimous abandonment of the case to Nature, of whom he speaks somewhat slightingly as being given to whims and fancies. He would destroy the organisms as they reach the surface of the urethra by the injection of silver salts, which, if they be nucleinate or proteinate, act as sedatives or bactericides in the early stage. In the chronic cases the electrochemically prepared iodine suspension of the same strength as the tincture of iodine has been of priceless service, alternated with silver nitrate irrigations and instillations. Iodine is recommended in all cases of chronic anterior urethritis which do not respond to the usual methods of treatment. Special caution is given to apply it directly to the diseased surface. Just how this is accomplished in the case of a chronic vesiculitis the author leaves to the imagination, or perhaps to the invention of the Futurists.

PHYSIOLOGICAL STUDY BEARING ON THE DISEASES OF THE BILE-DUCTS AND GALL-BLADDER.

MELTZER (*American Journal of the Medical Sciences,* April, 1917) regards the gall-bladder as an ingenious but simple mechanical device, by means of which a continuous glandular secretion is transformed into a discontinuous elimination. While the secretion of the bile into the biliary capillaries is a continuous process, the discharge of the bile through the common duct into the duodenum occurs only periodically. During the intervals between the periods of evacuation the bile is stored away in the then practically quiescent gall-bladder. It is an established fact that the bile salts as well as pigment are reabsorbed from the intestines, to be stored up again in the gall-bladder. It is quite probable that the presence of bile in the intestines, at a time when it is not needed for a specific digestive action, is liable to exert some injurious influence. Its periodical storage, therefore, in the gall-bladder presents a protective functional advantage. Furthermore, the bile in the gall-bladder is a great deal more concentrated than that which is present in the system of biliary ducts. Hence when the intestinal digestion is in that stage which requires the activity of the bile the intestine receives it by the aid of the gall-bladder at once in a

concentrated form. From its very function there is a tendency toward sepsis in the gall-bladder. Moreover, bile even under normal conditions seems to contain all the living pathogenic organisms. Even in health this may be so. In typhoid the blood harbors typhoid bacilli during the entire course of the disease. None the less, even in typhoid, cholangitis and cholecystitis are comparatively infrequent; this because the mucosa maintains its normal vitality and does not offer a favorable medium in which the microörganisms can settle and grow. Moreover, the other safeguarding factor is the absence of an abnormally prolonged stasis of the bile in the various parts of the biliary system. Bile stasis is of primary importance as a pathogenic factor in biliary diseases. Stasis alone, even without the intermediary action of inflammatory processes, favors the development of biliary calculi.

Hence it is obvious that the physiological quiescence of the gall-bladder harbors a pathogenic element. May not conditions happen which are capable of converting the periodically occurring physiological quiescence of the gall-bladder into an abnormally prolonged quiescence, thus converting the physiological storage of the bile into a pathological stasis? The law of contrary innervation is manifest in all functions of the animal body, and the author believes that a disturbance of this law is a factor of more or less importance in the pathogenesis of many disorders and diseases of the animal body. On general principles the impulses inhibiting the action of antagonists must be an integral part of any kind of a movement in the animal body. For instance, simultaneously with each contraction of the extensors an inhibition of any form of contraction of the flexors, and *vice versa*, must take place; otherwise normal locomotion would be practically impossible. This principle is an integral part of the respiratory mechanism, as it is of deglutition. Intestinal gastric colic is due to a disturbance of this law of contrary innervation, the caudal end remaining contracted and stationary while the cephalic end contracts and progresses forward. The gall-bladder is well provided with muscle fibers, the contraction of which will free the gall-bladder from its fluid contents. As to the termination of the common duct, Oddi stated some thirty years ago that the papilla of Vater is provided with circular muscle fibers which by their contraction close up the common duct. This contraction is strong enough to resist a pressure much higher than that which usually obtains in the bile-ducts. It is clear that the muscle fibers of the gall-bladder and those of the papilla are antagonists.

Applying our knowledge of the mechanism of the urinary bladder, and more generally the law of contrary innervation, the physiological mechanism of bile storage and bile discharge is quite simple. During the storage the muscle fibers in the papilla are contracted and those of the gall-bladder are inhibited; during the discharge the gall-bladder contracts and Oddi's muscle is relaxed; the bile has then no other way out but into the duodenum. The innervation of the concerned parts, although not yet settled in its details, is very interesting. According to Doyon, stimulation of the peripheral end of the splanchnic nerve causes simultaneously a contraction of the gall-bladder and an inhibition of the tonus of Oddi's muscle. The vagus, on the other hand, seems to contain motor fibers for the sphincter of the common duct and inhibitory nerve fibers for the gall-bladder. Furthermore, also the afferent innervations show the character of contrary innervation. For instance, stimulation of the central end of the vagus causes simultaneously a contraction of the gall-bladder and an inhibition of the sphincter muscle.

While the physiological muscular and nervous mechanism of bile storage and bile discharge is thus satisfactorily explained the question presents itself: What are the causes which bring about either of the two actions? Bruno stated that no bile appears in the duodenum as long as the stomach is empty. When a meal is taken the entrance of chyme into the duodenum gives the signal for an ejection of bile from the common

duct. Most interesting are the recent studies of Rost. He first established the fact that after cholecystotomy the escape of bile through the papilla of Vater is indeed continuous, while in normal animals it is always discontinuous, depending upon the entrance of food into the duodenum. He found, further, the instructive fact that injection of peptone or albumose through a duodenal fistula in a normal dog causes immediately a discharge of bile from the common duct, and he has proved that this takes place by a reflex act which causes a contraction of the gall-bladder and simultaneously a relaxation of the sphincter of the common duct.

From the foregoing it seems quite safely established that the physiological discontinuous character of the flow of bile into the duodenum is regulated by a reflex mechanism, dominated by the law of contrary innervation; that the integrity of the gall-bladder is an important part in this reflex mechanism; that the discharge of bile can be greatly curtailed by the absence or a restriction of the discharge of chyme from the stomach into the duodenum, and that the discharge of bile through the papilla of Vater into the duodenum is greatly enhanced by the presence in the lumen of the latter of peptone or albumose.

There are the influences of the partaking of food and of the character of the food which is partaken of which may prove sooner or later to be pathogenic factors in the formation of biliary diseases. Continuous fasting for many days, or even weeks, may be of less significance, since the consecutive stasis may be corrected by a gradual absorption of the stagnant bile and a great reduction or complete cessation of secretion of new bile. But simple infrequent feedings, say the partaking of only one meal or even two meals a day, may very gradually finally lead to pathological consequences. The accumulation of the bile in the gall-bladder and in the ducts for longer periods, and the continued repetition of these periods, may gradually reduce the normal resisting power of the corresponding mucous membranes which may become a serious pathogenic factor, in case the individual has passed or is passing through an infectious disease. Furthermore, taking the above-mentioned experiments of Rost in consideration, the abstaining from taking proteins or partaking of them infrequently or in minimum quantities may prove to be another factor in the pathogenesis of biliary diseases.

From these considerations it follows that even in health it is advisable to partake of comparatively frequent meals, although they need not consist of large quantities, and that the meal shall contain foods which readily send peptone and albumose into the duodenum. This principle ought to be especially observed in infectious diseases during which the bile contains the causative organisms. In typhoid, for instance, food should be administered every two hours, and the food should contain materials which may readily be converted into peptone and albumose.

IMPORTANT PRINCIPLES IN THE DRAINAGE AND TREATMENT OF WOUNDS.

PEARSON (*Lancet*, March 24, 1917) records his belief that antiseptics commonly used in wounds are valueless and that the secret of success lies in free drainage. He does not go so far as to assert that antiseptics are hurtful. What is sufficient drainage in the common infections of civil practice is usually totally inadequate when dealing with a wound infection of similar magnitude. It is impossible to overdrain. The freer the incision the quicker and more satisfactorily the wound heals. From the operative point of view drainage is merely a mechanical problem. The chief factors governing the efficacy of drainage are then: (1) Absence or reduction of resistance to outflow; (2) gravity; (3) capillary action. The first two of these are closely connected.

The freer the exit the less is the resistance offered to the escape of discharges from the wound. This shows the necessity for free incisions in dealing with infection, particularly in deep wounds. Our aim should be to convert these into cone-shaped openings,

the base of the cone being situated at the surface, so that free exit is obtained from all parts of the wound; pockets and tracks should be thoroughly opened up; "tunnels" should usually be laid open throughout unless anatomical considerations forbid; obstructions within the wound should be removed, so that good access and free exit are established throughout. The necessity for extensive surface openings is very much greater in the case of infections in projectile wounds than in those of civil practice, so that it is evident that there is something more than the mere question of free exit involved. The explanation is to be found in the nature of the infecting organisms, which usually contain large numbers of anaerobes in the former.

Free drainage in the wound itself will not avail if the outflow is obstructed externally, and therefore attention should always be paid to this matter. Dressings should not be applied tightly, splint pressure must be carefully avoided, and the patient must be disposed in bed in such a way that no pressure is exerted over the wound. These are points which are frequently neglected, and it is difficult in the course of a paper to frame rules for every case. Briefly, however, he points out that wounds in the posterior surfaces of thigh or leg should be treated by slinging the limb from a Balkan splint or leg cradle; in back and buttock wounds the patient should be placed on a "spinal bed" or framework with removable canvas "slats," so that pressure against the wound may be avoided—failing such an apparatus the patient should be kept in the lateral rather than in the dorsal position; wounds of the upper limb may often be conveniently treated by suspension in a Thomas knee-splint or from one of the more elaborate devices.

The value of gravity and the use of counter-openings as an aid to drainage are not sufficiently appreciated in practice. This is particularly so in cases of wounds on the front of the thigh with, perhaps, a compound fracture of the femur. In these it is not uncommon to find, even after weeks of treatment, that the only exit is an overflow, that the whole wound is a foul cesspool of pus which has tracked extensively in the limb, and that there is wide-spread necrosis of the bone and complete absence of union in the fracture. Such a condition can easily be avoided if in the first instance, no matter how free the anterior opening may be, a good counter-opening is made into the deepest part of the wound—preferably, in thigh cases, from the posteroexternal aspect of the limb.

In extensive wounds with much laceration of tissue it will frequently be necessary to make several counter-openings to deal with different recesses or "pockets," but the surgeon should have a definite purpose in view for each opening he makes; it must never be made by "rule of thumb," but to suit the exigencies of the particular case. The efficient drainage of each individual wound is a problem in itself which should be governed by definite principles indeed, but the details of which depend on the exact characters of the wound. Often it is a simple matter and can be determined at a mere glance; at other times it becomes one of great complexity and cannot be solved without thorough digital exploration and inspection of the wound on the operating table. Even then anatomical considerations may prevent one from following the most efficient mechanical plan, and one has to adopt something less. But what the author wishes to emphasize is that no other measures which we may employ will adequately replace a mechanically perfect system of drainage.

Capillary action, though of less importance than free exit and gravity, is also a valuable mechanical aid in promoting drainage; it literally "draws" the discharge. In employing gauze wicks and packs for this purpose it is important to observe the following points:

The gauze should extend into the various parts of the wound, which should be filled up evenly and with but moderate pressure throughout; it should constitute what the author terms a "fluff," and not a tight pack.

Dead spaces should not be left within the gauze or between the gauze and the walls of

the wound, as they will favor stagnation and decomposition of the discharge and form an excellent culture-ground for bacteria.

In order to maintain capillary action it is necessary to prevent water-logging of the gauze drain. Hence we should allow evaporation to take place and should never employ a water-proof covering over the dressing during the period of profuse discharge. For this reason, too, external dressings of gauze will be much better than close substances such as lint. The time-honored boric fomentation is strongly condemned at this stage, as it rapidly becomes merely a pus poultice, but unfortunately its use is still common. Copious coverings of wool and the application of firm, heavy bandages should similarly be avoided except for the purposes of transit. The use of large quantities of wool for the purpose of soaking discharge should also be condemned on grounds of economy, as much of the wool now in use is anything but absorbent, and discharges merely track along inside the dressing to find their escape in the bed-clothes. If the external gauze dressings become saturated they should be changed immediately.

It is in the acute virulent stage of infection, when the discharge is usually profuse and serous in character, that capillary action is an effective aid to drainage; it is of no value when discharge is thick and purulent. If gauze packs are used then, and if discharge is profuse, they become clogged with secretion in a short time, and acting as foreign bodies merely delay the cleansing of the wound.

If a wound is thoroughly cleansed of foreign material and dead tissue and efficiently drained on the lines indicated, the change in character of the discharge from thin serous to thick purulent is accompanied by such a diminution in amount that there is no stage in which we find a profuse purulent secretion. The occurrence, and particularly the persistence of the latter, should always lead one to suspect either a foreign body, dead tissue (especially bone), or defective drainage. Indeed, many flesh wounds treated on these lines clean up rapidly within a week, so that it is difficult to say that there has been any purulent stage, and they may readily be closed by secondary suture or strapping with adhesive plaster.

A drainage-tube should be employed where a dead space cannot be avoided by gauze packing, or where dead tissue is present whose complete removal is inadvisable during the early stage of infection (*e.g.*, most compound fractures), so that a prolonged period of free discharge is anticipated. The tube should lead down to this point, and it may often lie conveniently in the midst of the gauze packing, so that it does not come into contact with the walls of the wound. It must, however, act in the direction of gravity, if possible—through a counter-opening, if necessary. Through the tube a gauze wick may be introduced with advantage while the discharge is serous in character. Occasionally it is useful to keep both tubes and wick long, so that they project for some distance from the wound and in this way exert an increased siphonage or suction action on the discharge and convey it to a convenient receptacle.

In deep wounds where neither dead space nor necrotic tissue exists, but where the escape of discharge is in an upward direction, a tube should be led through a dependent counter-opening into the deepest part; or the wound may be enlarged in such manner that gravity no longer hinders but will favor drainage. Where neither measure is feasible a tube should be led directly through the wound to its deepest part, and through it discharge should be aspirated as it accumulates.

The advantages of loose dressings and their exposure to the air to prevent saturation and stagnation of discharge and to favor drainage by capillary action have been mentioned already; but exposure of the wound itself is sometimes of special value.

In the early stages of severe infection, when first a wound has been opened up, the author has sometimes found it advantageous merely to cover the wound with one or two thin layers of gauze, which are laid evenly

in contact with the surface all over, and to use a bed of dressings on to which the discharge runs. This is best suited to widely gaping or open wounds such as the raw ends of septic "chopped-off" amputation stumps, and he knows of no method by which they clean up and become covered with healthy granulations more quickly. Presumably, in addition to the continuous and thorough removal of all discharges, this method has the advantage of combating anaerobic infection very effectively.

Two of the most important complications which one meets in dealing with wounds are muscles which are the seat of inflammation which are liable to become permanently shortened, and so to lead to crippling deformities, especially in the limbs. Such deformities are usually easy to prevent but difficult to cure. Consequently we should guard against them from the start, and maintain the limb in suitable position. Contraction of the hamstrings with permanent flexion of the knees, and of the calf muscles with drop-foot, are amongst the most important; corresponding conditions may occur in the upper limb. If injury to muscles is likely to impair or destroy the mobility of a neighboring joint, the joint must be kept in the position in which it will be of the greatest use subsequently.

Secondary hemorrhage is almost invariably an indication that the drainage of a wound is faulty. Consequently it should not occur subsequently to operative treatment for infection, and it will practically disappear if adequate mechanical drainage is effected in the early stages. When it has occurred the case must be submitted to operation without delay, otherwise recurrence is a practical certainty. In every case in which it is anatomically possible the wound should be explored and the source of bleeding found and dealt with directly by ligation of the vessel on both sides of the erosion, choosing a healthy part of the vessel wall.

In conclusion the writer believes that efficient mechanical drainage is the essential factor in the successful treatment of infection.

The cardinal principles governing drainage are: Freedom of exit; gravity; capillary action.

Drainage-tubes should not be employed unnecessarily. They should effect the purposes for which they are used, and should not act injuriously in the wound.

Dressings should not be tight, of close texture, or waterproof. They should be exposed to the air while discharge is profuse.

Continuous irrigation aids disinfection by mechanical removal of discharge. It is usually not feasible when dealing with large numbers of cases. It is not necessary in order to obtain good results.

Free administration of fluids to the patient is an important adjunct in the treatment of sepsis.

The value of concentrated saline solutions and antiseptics as aids to disinfection is doubtful and negligible.

The use of salines and antiseptics in no way diminishes the necessity for free mechanical drainage.

Vaccines are not helpful in dealing with infections in wounds of war.

Rest is an important factor in wound treatment and should never be neglected.

Most of the complications and sequelæ of infection are due primarily to inefficient mechanical drainage, and are therefore preventable.

Delay in healing is almost invariably due to local mechanical causes.

THE LIMITS OF BLEEDING CONSIDERED FROM THE CLINICAL STANDPOINT.

BERNHEIM (*American Journal of the Medical Sciences*, April, 1917) holds that a rapidly falling blood-pressure is always a warning of value, although it must be remembered that nausea of the slightest degree will send the pressure down. Pallor, the clammy, sweaty skin, the anxious countenance, are all danger-signals that occur to one at once, and air-hunger when present is always of true diagnostic import.

In cases of severe hemorrhage—it matters

not what the cause—a good working rule is to transfuse if the blood-pressure falls as low as 70 mm. of mercury, since life is hardly possible with anything below this level. But even in these cases the rule must be somewhat elastic, because one can never tell when the pressure is going to rise. In some instances if the physician or surgeon in charge of the case has not taken the steps usual in emergency cases, such as salt infusions, etc., it may be wise to delay until these can be instituted, preparations for transfusion being made in the interval. If no appreciable results occur within one hour the case is usually hopeless unless new blood is introduced, and procrastination at this stage of the game is a fearfully dangerous plan.

Curiously enough, the blood picture itself is of little avail in severe accidental hemorrhage. Even in cases of actual air-hunger, blood counts alone do not indicate the dire need for fresh blood. In fact, so constantly has this state of affairs been found in cases of this sort that this feature is now entirely ignored. The explanation of this seeming paradox is that a sudden, terrific loss of blood apparently gives rise to a tightening up at first of the vascular apparatus, a narrowing of the vessel lumen, thus causing a concentration of the blood remaining in the peripheral system and at the same time preserving a blood-pressure sufficient to sustain life. The true anemia does not become apparent until later on, when the vessels have relaxed and taken up a renewed supply of plasma with the resultant blood dilution. It is, therefore, not infrequently an extremely difficult matter to determine the actual limits of bleeding. Cases must be judged in the aggregate, after a careful consideration of all features, and even then a positive answer is not always forthcoming.

Before dismissing the subject of accidental blood loss, a few words might be in order concerning the use and abuse of drugs and salt solution in the treatment of these conditions. Drugs are of little aid in acute bleeding, morphine, judiciously given, excepted. Digitalis and strophanthin may possibly momentarily support a faltering heart, but it is not the heart that is at fault. A quarter of a grain of morphine seems to be indicated at the start of any hemorrhage to quiet any restlessness; after that the doses had better be smaller, because of the depressant effect of this drug on respiration and blood-pressure. Measures to stop the bleeding should be instituted immediately, and the body should be kept as warm as possible, the foot of the bed elevated, the limbs bandaged, the patient kept quiet, and water given *ad libitum*. The custom of giving salt solution (or water) per rectum after an operation of any magnitude is a good one, and the salt infusion in cases of bleeding is also good, as is at times intravenous salt—all within reason. But it is ridiculous in the extreme to keep filling a patient full of salt solution just because a great quantity of blood has been lost. Salt solution will not turn into blood—yet it is all but expected to do so.

It never seems to occur to some men that a heart can be overdistended, that the blood can be made too dilute, that if 1000 Cc. or 1500 Cc. of salt do no good, a greater amount will be equally valueless. But time and time again has the author seen infusions repeated after 2000 Cc. of salt have been given without any benefit at all. Every one knows it is proper to give salt solution in cases of blood loss, but very few stop to consider how much ought to be given.

It should be generally understood that if the bleeding has not been too great a few hundred cubic centimeters of salt are all that is needed to tide a patient over. In cases of very severe hemorrhage the amount might be increased a bit, but if 1200 Cc. do not steady a falling blood-pressure or cause a slight rise its introduction had better be discontinued. Even when there has been a rise the greatest caution must be exercised, for be it remembered that in these desperate conditions salt will frequently cause a rise in blood-pressure, but will not sustain it. When the bleeding has been excessive a transfusion is indicated, because it has been conclusively shown that blood alone can raise a pressure and sustain it. Salt solu-

tion has no sustaining power *per se*, and when the fall comes after a rise from this means it usually portends the end, for added salt solution is useless. It never raises a pressure twice!

It should be understood that in cases of chronic bleeding the coagulation apparatus tends to become deranged, and the longer the seepage continues the less liable is spontaneous cessation to occur. And the curious feature is that in many of the worst of these cases the coagulation time of the blood outside the body is but little delayed.

The chronic anemias are, from the author's view-point, permitted to progress entirely too far. A continuously falling hemoglobin under this therapy is a danger-signal, and when the hemoglobin reaches, say, 30 per cent, why not introduce new blood and give the drugs a bit more to work on?

The same thing may be said of the indefinite undiagnosed anemias some of which are permanently cured by transfusion; and the intestinal bleedings from ulcers, duodenal and gastric, may be placed in the same category. The convalescence of many of these patients could be materially shortened by the introduction of whole blood. Why compel them to start from the depths and rebuild entirely when one knows it to be so difficult and tedious, when, by repeated demands, the blood-forming organs have been strained to the breaking point?

Bernheim urges that henceforth transfusion be not regarded entirely as a measure of last resort—food for the reporters by spectacular stories of the dead brought to life. A more thoughtful attitude concerning blood loss from any cause is greatly to be desired, and the phenomena accompanying bleedings of all magnitudes should be carefully noted and studied, with the view to improving the general knowledge of such matters. Furthermore, a partial revision of the existing ideas of combating hemorrhage and the condition commonly known as shock may possibly be of material advantage in view of the fact that transfusion may be done so readily at the present time. But above all, surgeons and physicians should learn to recognize the limits of bleeding and to act promptly. In the acute hemorrhages, according to his experience, the safest guide is the blood-pressure; in the chronic bleedings and the anemias it is the hemoglobin; but one must never lose sight of the fact that at times all signs fail, and there remains naught for guidance but experience and judgment. Under these circumstances the author's advice is, "When in doubt, transfuse!"

METHODS AND RESULTS IN SURGERY OF THE STOMACH AND INTESTINES.

CRILE (*West Virginia Medical Journal*, April, 1917), referring to acidosis, points out the danger of pink lips and hurried respiration in patients with diseases of the stomach and intestines. The respirations are increased, the temperature low, the brain power diminished, the lips bright-red. Life is projected in an alkaline medium; and life ends when alkalinity is overcome. When the body fluids become neutralized or acid death automatically follows. Every process of life is accompanied by the formation of acid by-products. Under normal conditions these constantly formed acid by-products are neutralized and the normal alkalinity of the body is maintained by the alkalies and bases normally stored in the body, and by the regulative action of the respiratory system, the liver, and the kidneys.

Since the main source of the vast potential alkalinity of the body must be the alkalies and bases derived from the food, when a patient is starved by vomiting his reserve alkalinity steadily falls. As a result the relatively slight acid production resulting from his diminished activities cannot be neutralized, and consequently the reserve alkalinity of the body is diminished.

As the acidity rises the respiratory rate is increased in order that the carbonic acid gas may be eliminated. Acidity interferes with the use of oxygen, and the power of the body to use oxygen decreases simultane-

ously with the increased intake of oxygen consequent upon the increased respiration; hence the pink lips and reddened mucous membranes—signs of the increased amount of free oxygen in the blood. This condition is known as pink asphyxia. The intense thirst manifested by these patients is an acid phenomenon, water being necessary to acid elimination. Another obvious sign of vanishing alkalinity is the mounting temperature. This last sign indicates the last critical stage before death and shows that the available stores of alkalies and bases have been exhausted and that the acids are therefore combining with the ammonia of the living protein molecules, the destruction of which produces the fever.

For the starved cases with strikingly red lips and dry tongue, and above all with a rising temperature, resurrection, not operation, is indicated.

Food, water, glucose, and sodium bicarbonate should be pushed. Those which are nearing their ultimate acidity may be rescued by bringing up a loop of the jejunum under local anesthesia and feeding through it.

Surgical trauma diminishes reserve alkalinity. In all but unquestionably good risks, therefore, in which the diagnosis is clear, a two-stage operation is indicated; first, a gastrojejunostomy, resection being deferred until the functional balance is restored and the basic factor of safety is increased—usually in about ten days.

Nitrous oxide is preferred to ether. The patient is treated as if acidosis were expected. Saline infusion is given subcutaneously; sodium bicarbonate and glucose are given by the Murphy drip. Sleep is induced by every possible means, since the lesions caused by acidosis can be repaired only during sleep. Morphine is contraindicated in cases in which acidosis is present or threatened, since morphine, while it prevents the further production of acids, also inhibits the neutralizing power of the body fluids to their normal alkalinity. Bromides per rectum are therefore substituted for morphine in these cases.

As to the resection of the stomach, this is done by the thermocautery between Peyer clamps, and the margins of the division are sterilized by the cautery. To prevent leakage the divided ends are invested and closed with the shoemaker stitch, and as a further protection a series of interrupted silk sutures reënforce the shoemaker stitch, which is of chromic gut.

In case of ulcer the operation is not the end, but rather only a part of the treatment. To be definitely cured the patient must continue for not less than six months under the same routine treatment as if no operation had been performed. Long postoperative treatment is required to effect a fundamental and permanent cure.

INTRACANALICULAR PAPILLOMA OF THE BREAST.

JUDD (*Journal-Lancet*, March, 1917) calls attention to the circumstance that the characteristic feature of intracanalicular papilloma of the breast is a bloody discharge from the nipple, this being often the only symptom, tumor not being palpable. Papillomas may be located at any point in the milk ducts. They have been reported as occurring between the ages of nineteen and eighty-one, though they seem more common past middle life. Papillary outgrowths arise from the walls of the milk duct. Tumors present will be found in the central part of the breast, usually just under the nipple. The only difference between intracanalicular papilloma and papillary cystadenoma would seem to be in the place of origin. Bleeding is more apt to be a symptom of benign condition than of malignancy. Nor does Judd regard bleeding as an indication for operation. He reports 12 cases which have been under observation for some time. They had no treatment, and with most of them the discharge ceased at the end of a few years. In one case on record the disease continued for twelve years. In one case reported by Lewis malignant changes were found in what was primarily an intracanalicular papilloma. This was the only case which Judd could find in which these changes

could be observed. The patient had bloody discharge from the nipple for three months. Erdmann reports two cases in his series which from gross appearances he thought were malignant, but the pathologist reported they were benign. Greenough and Simmons in a series of 20 cystadenomas report three malignant cases.

Judd has reviewed 100 consecutive cases of discharging nipples—50 which had serohemorrhagic discharge and 50 which had discharge of other forms. In the first group of 50 he found the following pathologic conditions associated with bleeding nipple: 27 patients had carcinoma of the breast; 12 had chronic cystic mastitis; 8 had intracanalicular papilloma. In three cases the early discharge seemed to be a serohemorrhagic oozing from the nipple, which later proved to be the seat of Paget's disease.

The second group of 50 cases included those in which there were various kinds of discharges, exclusive of the hemorrhagic type. There were 30 carcinomas; 14 were instances of chronic cystic mastitis, and four were intracanalicular papillomas, with two instances of simple cyst. A tumor was present in 29 of the 30 cases of carcinoma; the first symptom in 23 of the 29 was tumor. In the remaining seven cases there was discharge from the nipple.

A tumor or palpable thickening in the breast was present in seven of the 12 cases of chronic cystic mastitis. In nine of the 12 the first symptom was discharge. A palpable tumor was present in four of the eight cases of intracanalicular papilloma. In reviewing the 32 cases of papilloma of the breast he found 8 were intracystic papillomas; 8 intracystic carcinomatous papillomas; 10 intracanalicular papillomas; 3 carcinomatous intracanalicular papillomas; 1 intra-acinar papilloma; 2 intracanalicular papillomas associated with carcinoma of the breast. In this series carcinoma was present in 11. In three other cases the pathologist believed the disease was carcinomatous, but he was unable to make a definite diagnosis. The characteristic feature of these 32 cases was bleeding or a serohemorrhagic discharge from the nipple. In no instance was there a papilloma in the duct large enough to be palpated, except in one case, in which it extruded from the nipple; in each case where a mass was felt it was due to chronic mastitis.

This review of 100 cases of discharging nipples would seem to confirm former reports on the subject. Carcinoma appears to be the most common lesion producing a discharge from the nipple, but it is almost invariably associated with a tumor in the breast. Tumor is usually present, sometimes before the discharge begins. In some of Judd's cases of chronic cystic mastitis, the discharge may have been from a duct papilloma, for often these tumors are very small and might easily be overlooked. This series also seems to lend evidence to the contention that a hemorrhagic or serohemorrhagic discharge from the nipple in the absence of a palpable tumor is most often produced by benign intracanalicular papillomas. In view of this fact, treatment should be conservative, especially in young women. In older women, particularly if the condition is associated with chronic cystic mastitis, the best procedure would seem to be the removal of the mammary gland. If there are evidences of malignant change, a radical operation should be done.

METHOD OF OBTAINING BLOOD FROM INFANTS AND YOUNG CHILDREN.

KASTNER (*Wisconsin Medical Journal*, April, 1917) thus describes the procedure of obtaining blood from young children for the Wassermann or other tests. He states that in order to obtain sufficient blood from finger, toe, or ear, incisions are sometimes necessary that border on mutilation, and the end results oftentimes reveal as much blood outside the container as within. It is notorious that in the very young, for one reason or another, it is often very difficult and often impossible to needle successfully the various surface veins. In the infant with an open anterior fontanel the longitudinal sinus certainly offers an ideal site for an abundant and uncontaminated supply

of blood. Still, on account of a demand for skill and experience in a rather unusual direction, the longitudinal sinus is not apt to be a popular route of choice. Though a safe and certain procedure in skilled hands, puncturing the frontal sinus is apt to be considered a measure somewhat heroic when 1 or 2 Cc. of blood is the only desideratum.

As every method known has advantages and disadvantages, the choice of a method is after all only a question of expediency. That is the writer's chief reason and excuse for bringing to notice another method which, though also open to objections, he has found to be quite satisfactory and very practical.

The patient is wrapped in a sheet, arms down the side, just as if preparing for an intubation. Infants are held in the arms of an assistant, older children may sit on lap or table. The nostrils are cleansed with a mild antiseptic solution and a cotton applicator. Remembering that the common seat of epistaxis is from the lower and anterior portion of the cartilaginous nasal septum, where the mucous membrane is particularly thin and vascular, a short horizontal incision is here made with a small, sharp, cotton-guarded knife. The incision in the septal mucous membrane is best placed a trifle above the floor of the nasal passage and well in the nostril, selecting a site that is easily accessible, open to inspection, and convenient for subsequent tamponade. As soon as the cut is made, almost invariably blood begins to flow. The baby in arms is then bodily reversed and older children are bent sharply forward, so that in either case the tip of the nose is dependent and makes an admirable spout from which the blood drops or trickles into the test-tube or vial. When sufficient blood has been obtained the nostril is plugged with cotton. This method is most easily practiced in infants, but the writer has used it successfully and with little trouble in children of seven or eight years. The presence of a nasal discharge is apt to be troublesome and even a positive contraindication to nasal bleeding. A nasal discharge can be very effectively dealt with, however, by thoroughly plugging both nostrils before the incision is made.

The possibility of infection following the incision must be considered. Fortunately the great vascularity of the septal mucous membrane, which makes it such an excellent field for drawing blood, also is a safeguard against infection. The author has seen no nasal infection in any of his cases. A specimen drawn from the nostril is of course not sterile, but he doubts if the contamination is very much greater than when blood is drawn from a finger or toe. At any rate, it is wise to have the specimen in the laboratory as soon as possible after it is drawn.

APPROVED NEWER METHODS OF GENERAL ANESTHESIA.

COBURN (*Medical Record*, March 3, 1917) holds that the insufflation method, more particularly for the administration of ether, is one of the newer methods that will survive. There are three important subdivisions of this method, depending upon the termination of the tube that conducts the vapor to the patient, viz., the trachea, pharynx, and buccal cavity.

In tracheal insufflation, the patient is first deeply anesthetized by the usual means, the head is then thrown back, and by a Jackson laryngoscope, or other similar means, the vocal cords are exposed; then a semipliable catheter, about 22 to 24 F, is passed between them, and on into the trachea, until the distal end reaches to about an inch above the bifurcation. The laryngoscope is next withdrawn, the proximal end of the catheter connected with the apparatus, and the insufflation begun. The inward bound stream of air passes through the catheter, while the outward flow passes between the walls of the trachea and the tube.

In tracheal insufflation practically all of the respiratory effort is removed by delivering a large volume of air into the lower part of the trachea, and this undoubtedly is an important factor in the decreased amount of shock observed in this form of anesthesia. Obstruction to free respiratory movement, caused by the tongue and other

turgescent tissues of the throat, is more detrimental than it is generally considered. This may be largely corrected in the inhalation methods by the use of a suitable breathing tube, but the benefit thus gained is not so complete as that of tracheal insufflation.

Outside of the catheter the flow of air in tracheal insufflation is continuously outward. This prevents the aspiration of blood, and infectious and foreign material, and is another of the marked advantages of this method. Artificial respiration may be maintained by tracheal insufflation for hours, or even days, and constitutes the best means at our command for this purpose, once the catheter is inserted.

The amount of air insufflated into the trachea is about 270 gallons per hour, or practically double the usual respiratory movement. This amount of air is sufficient to keep the lungs distended when the pleural cavity is open, and tracheal insufflation has, therefore, come to be quite extensively used in chest surgery.

In pharyngeal insufflation, after the patient is deeply anesthetized, the short catheter is passed through the nares into the pharynx, and the insufflation begun. The amount of air insufflated need not always be so much as that required in the tracheal method, but the amount of ether vapor must be the same. The obstruction at the base of the tongue is automatically removed in the pharyngeal method also, but not so perfectly as in the tracheal method.

While tracheal insufflation has heretofore been extensively used in chest surgery, yet pharyngeal insufflation possesses special advantages for this very work. After the chest cavity is open, the distention of the lung is under more pliable control with pharyngeal insufflation, as such distention is continuous in the tracheal method, and the distended lung is always in the field of operation on account of this distention and thereby interferes with the work of the surgeon, whereas in the pharyngeal method the lung of the side under operation collapses, thereby facilitating the work of the surgeon. When the operation is completed and the surgeon is ready to tie the last sutures, the collapsed lung is easily and quickly expanded by placing a wet towel over the patient's face. This retards the outflow of air, and the insufflated air is of such large volume that it quickly distends the lung.

In insufflating into the buccal cavity the rubber tube is usually connected to a mouth-gag or curved metal tube. This method is more particularly adapted to the removal of tonsils and other short operations in the throat. In operations of this character, where the primary anesthesia is not of sufficient duration to last throughout the operation and a reapplication of the mask becomes necessary, the anesthesia should always be maintained by one of the insufflation methods so that the patient may not pass alternately from a deep to a light anesthesia. Passing alternately from a deep to a light anesthesia without rebreathing tends to produce sudden fatality, as shown by Henderson.

All of the insufflation methods possess advantages over the usual inhalation methods. The vapor is always warm as it is delivered to the patient. The rate of administration can be more evenly maintained, consequently the resulting anesthesia is smoother, and the patient is less liable to be overanesthetized. In tracheal and pharyngeal insufflation the obstruction at the base of the tongue is automatically eliminated, consequently the patient is not devitalized by forced breathing against respiratory obstruction. Most all of the electrically driven apparatus for insufflation now have a suction as well as a pressure appliance. The anesthetist and apparatus are away from the patient's head, and do not interfere with the surgeon, this feature alone rendering them the methods of choice in many operations within the throat and buccal cavity, and on and about the face and head.

It is quite certain that the chest cavity may be opened with impunity with either tracheal or pharyngeal insufflation; also with nitrous oxide when administered with the regular face mask, but under pressure, and with ether similarly administered.

The closed method with pure oxygen is another of the newer methods of administering ether that deserves permanent recognition. His attention was called to this method by Rice. He uses a Coburn breathing tube, through which he directs all of the respiratory current. To such tube he connects, by rather elaborate special fittings, a rubber bag into which he allows the oxygen to flow, after it is passed through ether. He uses about 16 gallons of oxygen per hour. He uses his regular apparatus for nitrous-oxide-oxygen-ether, and substitutes air for nitrous oxide. With this technique, only about 8 gallons of pure oxygen per hour is needed. As in all other inhalation methods, he uses the breathing tube to remove the obstruction at the base of the tongue. The oxygenation in this method is very good, and this undoubtedly contributes to its merits. Deficient oxygenation increases the toxication of all anesthetics.

Most of the objection raised against the administration of ether by the closed, or rebreathing, method is erroneously attributed to alleged harmfulness of carbon dioxide retention, when what is often meant is lack of proper oxygenation. It is only so long as the patient depends exclusively upon air for available oxygen that cyanosis and carbon dioxide retention go hand in hand, and the evil results of cyanosis have often wrongly been attributed to carbon dioxide retention, on account of this concomitant relation under the usual circumstances. When pure oxygen is added to the respiratory current, oxygenation and carbon dioxide retention vary independently of each other.

Carbon dioxide is a pronounced respiratory stimulant. Unless the patient is too deeply anesthetized, its excessive retention will be clearly indicated by the increased and deepened respiratory movements. This effect may be readily recognized, and is easily corrected by lessening the amount of rebreathing.

There are those who condemn rebreathing in ether administration, yet complacently use it with nitrous oxide. A greater inconsistency would be hard to find. At the present time, practically all of nitrous oxide administration is with rebreathing, thus thoroughly establishing the harmlessness of the principle when under supervision. Allied scientists have accepted this view, and the whole theory and practice in ventilation has changed accordingly. But much more can be said of rebreathing than that it is harmless, although this is full answer to the adverse critics. It possesses positive advantages, and it is for these advantages that its use is here advocated.

Muscular relaxation in the closed method with oxygen is ideal. This feature alone renders it the method of choice for administering ether in abdominal and pelvic surgery.

Nitrous-oxide-oxygen is another of the newer forms of anesthesia that is constantly gaining advocates. There is no question but that straight ether, from the point of view of use, is the leading anesthetic at the present time. But ether has certain physiological effects that greatly mar its usefulness. Its persisting and nauseating odor, its long and unpleasant induction, its long period of elimination, its irritating effect upon the organs of elimination and respiratory tract, its dissolving of the lipoids of the cells of the brain and other organs, its destructive action upon the red blood cells, its impairment of resistance against infection (as Crile tersely says, "ether anesthetizes the phagocytes as well as the patient"), and its general toxic effect as evidenced by nausea, vomiting, and depression, render it far from the ideal anesthetic. Many patients who have had experience with ether anesthesia remember its unpleasant features more distinctly than those of the operation, and do not fail so to express themselves to their friends. Thus both patients and friends often come to dread the anesthetic more than the operation. This preanesthetic fear—and most physicians do not recognize how much fear often exists—is highly productive of shock and greatly increases the very features of which they are in such dread.

Nitrous oxide, on the other hand, possesses only a little of a few of these unde-

sirable qualities, and none at all of most of them, and it usually leaves a pleasant impression upon the patient's mind, hence it is universally known as "laughing gas." Yet nitrous oxide has disadvantages peculiar to itself, the chief of which lies in the resulting anesthesia, which is not of sufficient depth to serve alone in many cases.

Preliminary medication by morphine and atropine, or preferably morphine and a small dose of scopolamine (1/200 gr.) renders nitrous oxide anesthesia deeper and smoother, and ought always to be used in all prolonged administrations. If this does not produce sufficient depth of anesthesia ether should be added in small amounts, as an adjuvant to the nitrous oxide. The anesthesia is thus quickly deepened to any required degree.

By administering nitrous oxide throughout, and adding the least amount of ether necessary to produce the required relaxation and depth of anesthesia, the toxication of the anesthetic is reduced to a minimum. The comparatively small amount of ether thus used does not produce the proportional toxication that this amount bears to the amount of straight ether required. The manifest toxication of drugs is not always in proportion to the amounts ingested. The system will tolerate poisonous substances without evidence of toxication up to certain amounts, varying more or less with each individual; then additional amounts show toxication in much greater degree than additional amounts bear to the amounts well tolerated. The amount of ether required as an adjuvant to nitrous oxide is so small that it is below the threshold for the manifestation of ether toxication in most cases, and in the cases where this amount is not below this threshold, straight ether would produce much more pronounced toxication.

The most scientific, and therefore the preferable, method of administering ether by inhalation is the closed method with oxygen.

In operation within the chest, throat, and buccal cavity, and about the face, the preferred method of administering ether is by insufflation.

Preliminary medication with nitrous oxide anesthesia and with a minimum of adjuvant ether when necessary is lighter, less toxic, and therefore preferable to straight ether anesthesia, from the viewpoint of the patient's physiology.

The system of anesthetization that is productive of the best results is anociation. This particular part of anociation consists of four essential and distinctive factors: preliminary medication, nitrous oxide general anesthesia, perfect local anesthesia, and gentle manipulations. Not one of these factors may be omitted or altered without compromising results, and passing beyond the pale of anociation.

THE SIGNIFICANCE OF XANTHOCROMIA OF THE CEREBROSPINAL FLUID.

SPRUNT and WALKER (*Johns Hopkins Hospital Bulletin*, February, 1917) observe that they have called attention to the clear, yellow spinal fluids occasionally observed at lumbar puncture. Their remarks are based on five cases observed and reported and an analysis of 100 cases from the literature.

The fluids may be divided into two main groups:

Those in which the color is due to dissolved hemoglobin or its derivatives, and which as a rule do not coagulate spontaneously and contain only a small amount of globulin. Such fluids usually are associated with brain tumors in contact with the meninges or ventricles.

The larger and more important group comprises those cases showing the so-called Froin's syndrome, in which the fluid is transparently clear, yellow, coagulates spontaneously, contains large amounts of globulin, may or may not show pleocytosis, and gives no positive tests for hemoglobin.

This is a "compression syndrome," its main determinants being the isolation of a lumbar cul-de-sac, in which the spinal fluid stagnates, and probably some vascular changes within its walls.

Clinically, with negative *x*-ray of the vertebral column, it is strongly suggestive of a

tumor of the spinal cord, although it may also be associated with intradural inflammatory processes.

WHEN TO USE THE CURETTE IN INFECTED ABORTIONS.

POLAK (*American Journal of Obstetrics and Diseases of Women and Children*, March, 1917) states that in the clean cases after securing free cervical dilatation, complete evacuation of the uterus by means of the curette, forceps, and finger, under a strict aseptic surgical technique, and the firm retraction of that organ, will leave the woman in the ideal condition to avoid complicating morbidity, provided she was not the subject of gonorrheal endocervicitis at the time of the miscarriage. The majority of abortions that are seen in practice, both in the hospital and on the outside, are not primarily clean, in that they have been examined or packed through an unprepared vulvovaginal orifice.

In the infected cases wise conservatism is followed by an amazing decrease in both mortality and morbidity, the patients usually expelling the uterine contents, the bleeding ceasing, the temperature dropping to and remaining normal. In the follow-up system he found that these patients complained of menorrhagia, sometimes very severe, for several periods following discharge from the hospital. For years it has been taught that curettage for an incomplete abortion, which is presumably infected, is an unsafe procedure. His cases in which the abortion began outside the hospital and were examined or packed one or more times through an unprepared introitus, were all infected. If the hemorrhage were negligible they were treated by the expectant plan.

The patient is put to bed in the Fowler position and an ice-bag placed over the uterus. If the bleeding is considerable a sterile gauze vaginal tampon is firmly introduced against the cervix. This usually controls the hemorrhage and causes the expulsion of portions of the secundines. Several severe bleedings after the patient had left the hospital caused the author to modify the routine. At present when a bleeding case is admitted a thorough vulvovaginal preparation is made and the interior of the uterus cultured. If this culture is returned negative, the uterine content is carefully evacuated after administering, hypodermically, an ampoule of pituitrin. This evacuation is accomplished by the curette or placental forceps when the pregnancy is of eight weeks or under, and with the placental forceps and finger when it is past this period. Following this evacuation of the uterine content, which is relatively bloodless if pituitrin has been used, the interior of the uterus is iodized, by packing with gauze soaked with tincture of iodine; this pack is allowed to remain in place for twenty minutes. The routine culture of the uterus has shown more than 60 per cent of the staphylococcus or streptococcus when such culture has been made from forty-eight hours to four days after the supposed miscarriage. Several women from whose uterus a positive culture of the streptococcus was obtained were curetted as controls, without any local reaction in the uterus or parametrium.

As a result of these culture investigations, Polak concludes that where pathogenic organisms have been demonstrated in the uterus, the expectant plan of treatment should be employed until a culture from the interior of the uterus shows no organism to be present, when the cavity of the uterus may be curetted and carefully iodized.

ANXIETY ABOUT THE LUMBAR PUNCTURE.

NEWMARK and BEERMAN (*Medical Record*, April 28, 1917) state that the danger attending a lumbar puncture in a case of intracranial tumor, especially when the growth is in the cerebellum, is widely known, but he holds that it should also be known that when the tumor is intraspinal the effect of the puncture may be to seriously increase the compression of the cord. This happened in an instance reported by Nonne, to such a degree that the patient

became paralyzed in all four limbs, and, in spite of the immediate removal of the tumor, lost his life.

In one of the authors' cases in which there was an intradural psammona opposite the second dorsal spinous process, the paresis of one of the lower extremities was converted into complete paralysis after they had removed about 6 Cc. of fluid.

In another case of compression of the cord by the same kind of tumor they had to answer for very severe consequences. In this case they observed that a "dry tap" may be as productive of serious results as a copious flow of fluid. The patient was a young woman who complained of a slight weakness of one foot, but she walked without conspicuous trouble and was even able to dance. One serologist having found the Wassermann reaction of the blood serum positive and another negative, and each on repeating the test adhering to his first result, a decision was sought from the spinal fluid. One of the serologists inserted the needle several times without obtaining fluid, with the patient at first in the lateral and then in the sitting posture. On the following day the girl complained of headache such as would be expected after the evacuation of the liquor; her legs, moreover, began to get weak, and in three days after the puncture there was almost complete paralysis of one lower extremity, paresis of the other, and anesthesia. They heard ominous mutterings about their having "punctured an important nerve," and with the consequent impairment of their credit found it difficult to obtain consent to an operation for the removal of a tumor which the sequel of the puncture had enabled them to diagnose and localize. Eventually the growth was removed by Dr. Harry M. Sherman and the patient recovered completely. In the light of the issue the puncture was seen in both of these tumor cases to have been advantageous to the patients, by increasing the compression of the cord and indicating more exactly the level of the lesion; the second case was "matured," so to speak, and the cure of the patient hastened, perhaps by months.

In two other instances, one of cerebrospinal syphilis and the other perhaps of multiple sclerosis, a puncture which failed to produce fluid was nevertheless followed by severe headache. In the second of these cases they learned from the patient that the puncture which had been performed several months before had caused intense pain in the back of the head for ten days; they punctured her without difficulty and withdrew about 3 Cc. of fluid, and caused her no subsequent suffering at all, so that they have the curious case of a "dry tap" occasioning much distress while a productive one was tolerated with ease.

They have done lumbar puncture when there was compression of the cord by an intradural tumor, without observing any exacerbation, and have read of many other cases in which the puncture was made with impunity. On the other hand cases might be adduced to show that sudden, or at least rapid, aggravation may occur, unprovoked by any deed of the doctor. Hence the question may arise whether we may not be dealing with a coincidence when the lumbar puncture has seemed to precipitate a disaster.

For the benefit of some unfortunate physician who may desire to plead a mere concurrence of events without causal relation, when he finds himself in the plight they are trying to illustrate, they mention the case of a woman who had a hemiparesis which had come on rapidly a few days before they saw her. There were no headaches, no choked discs or other signs of pressure, and one got rather the impression of a vascular disease than a growth. After deliberating for ten days the authors determined to get what information lumbar puncture would furnish and set a morning for the little operation; but on their arrival they found that in the night violent headaches had set in, the paresis had developed into absolute paralysis and papillitis, and a slow pulse signified the acute increase of intracranial pressure. Had they been less tardy in their resolve to do the puncture, by only a few hours, there would have been no means of absolving

themselves from responsibility for the woman's grave condition. Indeed, they should not have doubted it themselves, and should have been charged with it by others. The patient died a month later, and they show by reproduction of a Weigert section through both hemispheres how a large sarcoma of the thalamus may exist without those symptoms of increased pressure which might warn the doctor against doing that which he may be sorry for.

A PLAN FOR THE PREVENTION OF VENEREAL DISEASES.

WOLBARST (*Medical Record*, April 28, 1917) offers the following plan:

There shall be established a medical department or service within the regular medical service, which shall deal exclusively with the venereal diseases. This department shall be in charge of an officer (not necessarily but preferably from the regular army medical corps) of executive ability, who has in addition experience with the venereal diseases and their prophylaxis. Each division, brigade, and regiment shall have its venereal officer, who shall be responsible for his particular unit. The number of venereal officers to be attached to the respective units to be determined by the authorities experienced in these matters. One officer would probably be sufficient for a regiment, possibly two or more.

Taking the regiment as a convenient unit for the purpose, prophylaxis would be carried out as follows:

Instruction to be given to all men of the regiment in the subject of venereal diseases, their consequences, sequelæ, etc. This instruction to be repeated at frequent intervals and reënforced by the liberal use of prophylactic literature, moving pictures, slides, etc., dealing solely with the medical side of the question.

All women known or suspected of being lewd, whether professional or clandestine, to be ordered and kept away from camp for a prescribed distance (as practiced with much success in some sectors on the Mexican border during the recent mobilization). If found within the forbidden area, they are to be apprehended and subjected to a rigid physical examination; and if found diseased they are to be sent to the hospital. On their discharge, if found a second time within the forbidden area they are to be imprisoned.

No alcoholic liquors to be sold to an enlisted man, under severe penalty; no saloons within the forbidden area they are to be camp. Any soldier smelling of liquor or intoxicated to be severely punished.

Any soldier that develops a venereal disease shall be punished. This regulation needs some explanation. It is believed that the methods of prophylaxis hereinafter described will serve to prevent infection in a large proportion of cases, and perhaps in 100 per cent of cases, when properly employed. If infection results, it is an evidence of improper "disinfection," either on the part of the subject of the disease or of the officer in charge of the "disinfection." In either event, it being the duty of the soldier to see that he obtains adequate prophylactic treatment, failure to do so brings with it the prescribed penalty.

Adoption of a rule, providing for certain rewards or privileges for those who do not acquire venereal disease. In other words, reward those who remain uninfected and punish those who become infected. The question of abstinence or continence is not to enter into consideration. Whether the man indulges and by the use of prophylactic measures avoids infection, or whether he abstains and thereby avoids infection, does not concern the medical men. The important thing is that he has avoided infection, and for that he is to be rewarded. The fact that he has remained free from venereal disease for a certain period should entitle him to certain privileges and rewards so long as he remains uninfected. This will encourage abstinence or proper prophylaxis.

Every man to be provided with a personal prophylactic, such as has been used with such signal success in the army and navy, particularly the latter. This is to be accompanied with the usual instructions to use it, in case he indulges in sexual intercourse.

On his return to camp, whether he has had intercourse or not, he is to be given a mercurial inunction of the penis and an intravesical irrigation of some mild antiseptic, such as permanganate, argyrol, protargol, etc. This is based on the theory that his leaving the camp is to be construed as sufficient presumption of possible exposure and infection, and therefore as sufficient justification for the adoption of suitable protective measures. The particular form of these protective measures—"disinfection," in other words—is immaterial. This may be left to the discretion of the venereal officer in charge; the important thing is to see that every man who has left camp for any purpose, and has returned, is disinfected, so to speak, so that he shall not bring venereal infection into camp with him.

It shall be the duty of the venereal officer to see to it that this "disinfection" shall be properly and strictly administered and properly followed up by careful physical examination every day thereafter until all danger of infection has been eliminated.

The venereal officer, or one of his subordinates, shall examine every man daily for venereal infection; this to consist of the examination of the external genitals for any evidence of lues, and an inspection of the urine, in two glasses, for the presence of evidence of gonorrhea.

If a man is infected, in spite of these prophylactic measures, it shall be the duty of the venereal officer to locate the woman through whom the man was infected. Whatever her station in life, she shall be apprehended, carefully examined, and if found diseased, she shall be sent to the hospital; if she is found within the prohibited area, she shall be punished by imprisonment after she has been discharged from the hospital; if not within the forbidden area, she shall be warned to keep away from the men thereafter, on penalty of imprisonment if discovered. The object of this regulation being that any woman who harbors infection is a menace to the health of the army and must be treated as such—first cured, and then punished.

It is assumed that every man, on enlistment, is examined by a medical officer for latent gonorrhea and lues. If evidence of either disease is found, he is to receive appropriate treatment; but this treatment need not bar him from his regular duties of training, etc.

It is assumed that the camp hospital will contain ample provision for bed-treatment of complications, such as epididymitis, etc., and for the administration of salvarsan, etc.

The personnel of the venereal service will require some attention. Conceivably, the regular medical corps will devote their full time to sanitation and treatment of the sick and wounded; it would, therefore, appear desirable that the venereal service be placed in the care of civilians who have specialized in the venereal diseases. Inasmuch as the training camps will most likely be situated not far from our big cities, it will not be difficult to secure the services of such specialists for the venereal service. Particularly will this be possible if arrangements can be made whereby men with family responsibilities need not give up their full time to this work. In view of the character of the venereal work, it is conceivable that an officer may attend his duties by giving up several hours a day, thus alternating with another colleague who also gives up several hours daily. Continuous attendance will not be required in the performance of this work; expert supervision and technical ability are, however, very important. In any given regiment or larger unit, if it were found that a venereal officer could take care of, say, 500 men by visiting the camp every morning, his colleague could take care of 500 additional men every afternoon. In this manner experts could be obtained whose services in this particular field of endeavor could not be had in any other way.

The venereal officer would have under his immediate direction a number of orderlies, or preferably medical students, who would give up all of their time to this service and carry out the orders of the venereal officer. Intelligent enlisted men, who in civil life were clerks, salesmen, bookkeepers, etc., could very readily be trained to perform some of these duties with satisfaction. With

the help of intelligent assistance it is conceivably possible for one venereal officer to assume charge of several thousand men, even more possibly, the actual work being done by his subordinates, under his immediate supervision.

Operative work following in the wake of venereal complications, such as prostatic abscess, epididymostomy, etc., could be done either by the venereal officer in the venereal pavilion set aside for this purpose, or by mutual agreement could be transferred to the general surgical service, the patient to be returned to the venereal service when discharged. This is a matter of detail which does not affect the general plan to any extent.

IMMEDIATE AFTER-TREATMENT OF THE GUILLOTINE AMPUTATION STUMP.

Woolfenden and Campbell (*Lancet*, April 14, 1917) observe that the guillotine amputation stump usually arrives in the base hospital with a not inconsiderable amount of retraction of the skin, more especially after it has been treated for several days without any effort being made to prevent the retraction. Any extension applied to the skin in order to be really effective should commence immediately after operation, be continuous, and result in a more or less complete covering in of the stump. These ends seem to be most satisfactorily attained by the following method, which the authors have used for a long time in such cases in the hospital with which they were connected:

On the completion of the amputation each of the quadrants of skin is perforated with the knife by a pair of stab incisions about 1 inch apart and 1½ inches from the edge, and a loop of sterilized tape 10 inches long is passed through each pair of perforations so that the tension is borne by the surface of the skin when the loop is pulled on. The loops of tape are gently pulled down by the assistant and the stump is dressed and firmly bandaged. After this the stump is placed in an ordinary Thomas knee or arm splint and supported in the usual fashion. The loops of tape are then attached to the end of the splint by fairly stout rubber tubing tightened to the required degree and altered from time to time. Any subsequent dressing can readily and easily be accomplished without slackening the extension by merely removing the dressing from between the loops of tape. On the second to the fourth day the tapes are removed and the extension is kept up by strips of crinoline bandage. To the edge of one end of each strip are attached a pair of ordinary metal hooks. These pieces of bandage are glued to the skin by collodion with the hooks placed about one or two inches from the skin edge. A loop of tape is then passed around the hooks and rubber applied as before. The hooks and collodion are best changed every two or three days. It is most important that the skin should never be allowed to retract when changing the soiled hooks; this can be prevented by an assistant keeping the skin drawn down. The object of the elastic extension is to maintain a continuous pull on the skin as it stretches under the extension.

By the above means every guillotine amputation can be easily transported, nearly every stump almost completely covered in when discharged to England (more especially if short flaps of ¾ inch to 1 inch have been made at the time of the operation), the stay of the patient in hospital considerably diminished, and the necessity of subsequently shortening the stump obviated, or at any rate the amount of bone requiring removal much lessened. In addition the stump is considerably steadied, with consequent greater comfort to the patient.

REVIEWS.

THE ELEMENTS OF THE SCIENCE OF NUTRITION. By Graham Lusk, Ph.D., Sc.D., F.R.S. Third Edition, Illustrated. W. B. Saunders Co., Philadelphia, 1917. Price $4.50.

Professor Lusk is one of the leaders, if not the leader, in nutritional studies in this country. The first edition of his book appeared ten years ago. The advances which have been made in regard to our knowledge of metabolic processes during this period have been great, and we are glad to say that, through the liberality of wealthy persons, this science has been advanced more rapidly within recent years in the United States than ever before, notably by Mrs. Russell Sage and the Trustees of the Russell Sage Institute of Pathology.

It is interesting to note that at the close of his preface the author makes the promise, which few other authors have ever made, namely, that he has no intention of again revising this book, because in another decade he believes that the development of scientific knowledge will permit the formulation of the subject from the standpoint of physical chemistry. He hopes that the joy of the labor may be as great to him who next reviews the subject as it has been to himself.

The volume contains twenty-one chapters, with an appendix and index. In the introduction it is pointed out that the early scientific observations upon nutrition were founded upon the commonly known fact that in spite of the ingestion of quantities of food a normal man did not vary greatly in size from year to year. After the introductory chapter the colorimeter, which is such an essential piece of apparatus in the study of nutritional processes, is described in detail, and then follow chapters upon starvation, regulation of temperature, the influence of protein food and of the ingestion of fats and carbohydrates, the influence of mechanical work on metabolism, and a discussion of normal diet with the nutritive value of various materials used as foods. Possibly the author did not intend to make this an exhaustive chapter, leaving the consideration of this subject in detail to books on dietetics. We wish that he might have made it longer. One of the most interesting chapters, of course, is that which deals with metabolism in fever, and that upon the changes in nutrition in gout. In this connection it is interesting to note the dogmatic statement of the author that it is impossible to oxidize uric acid and no treatment now known increases its solubility; and, again, that the present doctrine concerning metabolism and gout may shortly become entirely obsolete through new and far-reaching discoveries. The chapter upon the influence of certain drugs upon metabolism is distressingly brief, covering less than two pages and quoting only two researches. In the appendix an immense amount of information is given as to the composition of ordinary food materials.

We do not know whether a publication of this kind is capable of increasing the reputation and standing of an author who has already reached the top notch as to scientific reputation. If such a thing is possible the third edition of Dr. Lusk's work bids fair to place fresh honors upon him.

EXPERIMENTAL PHARMACOLOGY. By Dennis E. Jackson, Ph.D., M.D. C. V. Mosby Company, St. Louis, 1917.

We are told in the preface that the writer has had a growing conviction for several years that the teaching of pharmacology might be greatly facilitated, and rendered much more effective and comprehensive, if each student could have in his hands a laboratory manual giving exact, specific, detailed directions for carrying out most of the experiments which he is called upon to perform in the study of this subject. He has, therefore, given us a working manual for undergraduate students of pharmacology in which experiment after experiment is given, extending up to 168 sections, but dealing in reality with many more experiments than this number.

In part two he describes equipment of the shop work necessary and deals with

photography in making records. Last of all he gives a list of dealers in equipment and supplies.

Naturally a large part of the work deals with the frog, but experiments upon the dog, cat, turtle, and rabbit are also included. Unlike some of the works in experimental pharmacology, this one is essentially what it claims to be, a working manual.

The colored plates, of which there are no less than twenty-four, give excellent illustrations of the incisions which are to be made, and the vessels and nerves which are to be operated upon or otherwise manipulated.

At the present time it is the fashion to teach undergraduate students pharmacology. From a fairly large experience we believe that it is being carried to excess. In no medical school is there sufficient time in existence for the putting aside of enough hours to make competent pharmacologists out of any of the students. Unless a man has a somewhat extraordinary bent for experimental work he can no more become an accurate, scientific investigator than an ordinary individual can become a violinist, and, in the majorty of instances in our experience, the so-called student of pharmacology does not even become a fiddler. What is needed is a certain amount of pharmacological work in sections, the actual work being largely done by a competent instructor, who can then transfer his class to the wards of a hospital where the physiological action and therapeutic use of drugs are given practical application. The student is thereby taught the practical use of remedies and is taught efficiently how they act without wasting precious time in repeating old experiments, which he will inevitably do very badly unless he has so much assistance that the instructor might as well do the whole work himself.

For students who wish to become pharmacologists, or for students who have to perform so-called pharmacological investigation in order that they may take one more step toward their medical degree, this book is to be highly recommended. The author has succeeded in preparing text which will prove useful and instructive, and if a certain pathway is to be followed, we believe that this is the best guide-book yet published which can be utilized in following it.

MEDICAL CLINICS OF CHICAGO. Volume 2, No. 5, March, 1917. Volume 2, No. 6, May, 1917. W. B. Saunders Company, Philadelphia, 1917.

As our readers know, the object is to present the profession in these so-called "Clinics" with the facts, theories, and opinions stated by various medical and surgical clinicians in the hospitals of Chicago. There are thirteen contributors to the present volume, which contains two hundred pages and which deals with a large number of subjects, several being discussed in each clinic.

What has just been said in regard to the March issue holds true in regard to the May issue, although, of course, a different series of clinicians make the contributions. This issue also contains a very copious index of the material of all the clinics which have appeared in Volume 2, and, with this index, covers about 250 pages.

THE INTENSIVE TREATMENT OF SYPHILIS AND LOCOMOTOR ATAXIA BY AACHEN METHODS. By Reginald Hayes, M.R.C.S. Second Edition, Revised. Bailliere, Tindall & Cox, London, 1917. Price 3s. 6d.

This little book contains eighty-eight pages and four plates, and has much to do with the employment of inunctions of mercury in the treatment of syphilis, although the author distinctly states that inunctions must not be considered in any way as a rival to the injection of salvarsan and other trustworthy arsenical preparations. One of the objects of the author, often overlooked, is to impress upon us the necessity of seeing that the inunction is well given. Much of the treatment by this method fails through carelessness or ignorance as to the proper use of inunctions, and it is for these reasons that Hayes believes that much of the uncertainty of results exists to-day. By Aachen methods Hayes means the inunction of thirty-three and a third per cent mercurial ointment by the bare hands of a skilled rubber under proper medical supervision, and in addition the use of sulphur water internally and externally as it is ad-

ministered at Aachen. This is the essential thing or foundation upon which the treatment is based.

CONGENITAL WORD BLINDNESS. By James Hinshelwood, M.A., M.D. H. K. Lewis & Co., London, 1917. Price 4s.

This is an essay upon a subject which is comparatively little known. The author has thought it advisable to gather together in book form the studies and observations which he has made, and to combine them with the contributions which have appeared in various medical journals during the last twenty years. The book contains five chapters dealing with acquired word blindness, congenital word blindness, hereditary congenital word blindness, its diagnosis, prognosis, and treatment. He opens with a somewhat historical account of the subject, and then proceeds to the discussion of the lesions and symptoms which are present in patients suffering from this interesting disorder. Contrary to the belief of some writers, he thinks that to overcome word blindness is not a hopeless proposition, believing that in nearly all cases children so affected with proper treatment and perseverance can be taught to read. To those who are interested in this subject this small contribution will doubtless prove of value.

MUSCLE TRAINING IN THE TREATMENT OF INFANTILE PARALYSIS. By Wilhemine G. Wright. Ernest Gregory, Boston, 1916. Price 25 cents.

The authoress of this little manual is a graduate of the Boston Normal School of Gymnastics and the Orthopedic Clinic of Hoffa, in Berlin, and, what is more important, is an assistant of Dr. Robert W. Lovett of Boston. She has prepared an interesting little brochure in which the practical details of treating loss of power due to infantile paralysis are carefully considered, definite directions as to exercises being given for practically all the important muscles in the neck, body, and limbs.

The remarkable result which can be obtained by careful, persistent, and patient training of the muscles which have lost power, or of other unaffected muscles which can be made to do some of the work of those which are paralyzed, is one of the notable things in connection with modern methods of treating disease. Doubtless many practitioners will be glad to have this brief, yet clear, description of what they can direct intelligent mothers and nurses to do for their patients, after the acute stages of poliomyelitis have passed by.

ROENTGEN TECHNIQUE. By Norman C. Prince, M.D. With 71 Illustrations. C. V. Mosby Co., St. Louis, 1917. Price $2.00.

This is a handsomely gotten up manual of 140 pages dealing with the subject included in its title. The number of illustrations take up a very large amount of space, and as the type is large and heavily leaded the book does not contain much text. After a consideration of the general principles which govern the technical use of the roentgen rays, the author describes *x*-ray tubes, operation of the machine, general routine methods of examination, positions and exposures which are to be made, the location of foreign bodies, and dark-room procedures. The sixth chapter is possibly one of the most important, in that it deals with sinus disease. Careful directions are given as to the use of a special bismuth paste to determine the presence of the conditions which may be causing much suffering, or even endangering life.

PRACTICAL MEDICINE SERIES, 1917. Volume One, General Medicine. The Year Book Publishers, Chicago, 1917. Price $1.50.

As we have pointed out in previous years, the present volume is one of a series of ten due at almost monthly intervals, designed to cover the entire field of medicine and surgery, under the editorial charge of Dr. Charles L. Mix. This volume, edited by Dr. Frank Billings, assisted by Dr. B. O. Ralston, is designed to give us a summarization of medical literature, in distinction from surgical or special medical literature, for the past twelve months. The foot-notes clearly reveal the universal difficulty of writers in dealing with anything else except English and American medicine, since literature from the Continent of Europe is practically no longer obtainable. The volume

maintains the high quality which its predecessors have possessed, and we hope that it will continue to be appreciated by the profession.

DIAGNOSTIC SYMPTOMS IN NERVOUS DISEASES. By Edward Livingston Hunt, M.D. Second Edition, Revised. W. B. Saunders Company, Philadelphia, 1917. Price $2.00.

When the first edition of this little book appeared we referred to it in complimentary phrases. As its title indicates, it is not an exhaustive manual dealing with nervous diseases. In its three hundred pages, with wide-spaced type, it deals with the diagnosis of functional and organic diseases of the nervous system. Its illustrations are definitely clinical, taken directly from patients. It is a first-rate little condensed manual of the subject of which it treats.

PHYSICAL EXERCISES FOR INVALIDS AND CONVALESCENTS. By Edward H. Ochsner, Ph.D., M.D., F.A.C.S. C. V. Mosby Co., St. Louis, Mo. Price 75 cents.

Dr. Ochsner is known for other things than the subject with which this little manual deals, for the text only covers fifty-four pages, or, to speak more correctly, there are only fifty-four pages between the covers. The average page contains five to six lines of text, and the balance is an illustration of the attitude or exercise which should be taken by the patient to develop various muscles and keep himself in good trim.

DANGERS IN NECKWEAR. By W. G. Walford, M.D. H. K. Lewis & Co., London, 1917. Price 4s.

We learn from the title-page that the author of this book, with its somewhat remarkable title, is also the author of another upon Cerebral Congestion and Tight Neck Clothing. He takes two hundred pages to consider the subject with which he deals, and gives a number of illustrations as to the changes which can be produced in the neck by relieving pressure exercised by tight collars or bands. We confess that we cannot help feeling that the mountain has been in labor and has brought forth a mouse. There may be some doubt as to the mountain, but there is no doubt as to the mouse.

NOTES AND QUERIES.

GOVERNMENT RULING AS TO SYNTHETIC DRUGS.

The *California State Medical Journal* for May, 1917, prints a letter of instructions of the Treasury Department:

To the Collector of Internal Revenue, Revenue Agents, and Others concerned:

Referring to T. D. 2194, holding that any synthetic substitute for cocaine, alpha or beta eucaine, or their salts or derivatives, comes within the provisions of the Act of December 17, 1914, and that persons using or having in their possession any such synthetic substitute are required to register and obtain such substitutes upon official order forms and otherwise conform to this act, this office has decided to suspend the enforcement of the ruling of April 26, 1915, until you are otherwise advised.

This action is taken in view of the decisions of the U. S. District Court, Southern District of New York, of June 28, 1915, and of the Circuit Court of Appeals for the Second Circuit, of February 21, 1916, holding that these synthetic substitutes did not come within the provisions of section I of the act.

W. H. OSBORN,
Commissioner.

Approved:
W. G. McADOO, Secretary.

CORRESPONDENCE.

A CORRECTION IN DR. BONIME'S ARTICLE IN THE JUNE ISSUE.

To the Editor of the THERAPEUTIC GAZETTE:

SIR: In transposing the first note accompanying the chart from the top of the chart to the bottom an error was made in the number of dilutions. It is printed "IV" instead of "VI." The note should read: "If a reaction occurs . . . begin treatment with the next dilution, in this case No. 'VI,'" not "IV" as it is now printed.

NEW YORK. ELLIS BONIME, M.D.